

BULLETIN No. 35

COPYRIGHT 1934

ISSUED BY
THE RAILWAY AND LOCOMOTIVE HISTORICAL SOCIETY, INC.
BAKER LIBRARY, HARVARD BUSINESS SCHOOL
BOSTON, MASSACHUSETTS

OCTOBER, 1934

Price for Members \$1.00

Price for Non-members \$2.00

Transportation
Library

TF

I

, R123

no. 35-43

Table of Contents

| | |
|---|----|
| Cover Design | 6 |
| The Tyrone & Clearfield Railroad | 7 |
| An Early Streamlined Train | 9 |
| The 4-4-0 (American) Type of Locomotive | 10 |
| The Pennoyer Colored Prints | 37 |
| Early Railroad Items | 38 |
| The History of San Francisco's First Railroad | 52 |
| Locomotives of the Boston & Maine Railroad | 62 |
| The Early History of the "Milwaukee" | 77 |
| Yesterdays at the Grand Central | 79 |
| Brief Sojourns | 84 |
| Canadian Material | 86 |
| Worth Reading | 87 |
| In Memoriam | 89 |

*Officers and Directors of the Railway and Locomotive
Historical Society, Inc.*

CHAS. E. FISHER, *President*
6 Orkney Road, Brookline, Mass.

EDWARD HUNGERFORD, *Vice President*
230 Park Ave., New York, N. Y.

WARREN JACOBS, *Secretary*
South Station, Boston, Mass.

GEO. P. BECKER, *Treasurer*
96 Avon Hill St., Cambridge, Mass.

J. W. MERRILL, *Curator*
40 Broad St., Boston, Mass.

W. O. MOODY, *Director*
47 North Spring Ave., La Grange, Ill.

W. R. FOGG, *Director*
26 Monadnock St., Boston, Mass.

SIDNEY WITHINGTON, *Director*
7 Briar Lane, New Haven, Ct.

ARTHUR B. NICHOLS, *Director*
Vice President, Boston & Maine R. R., Boston, Mass

G. W. BISHOP, *Resident European Director*
12 Queen's Road, Kenilworth, Warwickshire, England

D. L. JOSLYN, *Resident Western Director*
2164 Castro Way, Sacramento, Calif.

PROF. EDWARD C. SCHMIDT, *Mid-Western Representative*
905 West California Ave., Urbana, Illinois

E. W. YOUNG, *Pacific Coast Representative*
2727 Pierce St., San Francisco, Cal.

ROBERT R. BROWN, *Eastern Canadian Representative*
700 St. Catherine St., West, Montreal, P. Q., Canada

NORMAN THOMPSON, *Western Canadian Representative*
Box No. 2004, Winnipeg, Manitoba, Canada

D. S. BARRIE, *British Representative*
24 Goldhurst Terrace, Hempstead, London, N. W. 6, England

THOMAS T. TABER, *Traveling Representative*
43 Hillcrest Road, Madison, N. J.

CARLTON PARKER, *Exchange Manager*
45 Warren St., Newton Center, Mass.

The Railway and Locomotive Historical Society, INC.

COMMITTEE IN CHARGE OF PUBLICATIONS

| | |
|--|------------------------------|
| CHAS. E. FISHER, <i>Editor</i> | O. KUHLER, <i>Art Editor</i> |
| W. J. COUGHTRY, <i>Chairman, New York Committee</i> | |
| W. A. LUCAS | R. C. SCHMID |
| PROF. E. C. SCHMIDT, <i>Chairman, Mid-West Committee</i> | |
| W. O. MOODY | |
| D. L. JOSLYN, <i>Chairman, Western Committee</i> | |
| G. H. KNEISS | S. F. MERRITT |
| ROBERT R. BROWN, <i>Chairman, Canadian Committee</i> | S. H. TRUITT |
| W. T. COMLEY | J. H. EDGAR |
| W. M. SPRIGGS | JOHN LOYE |
| G. W. BISHOP, <i>Chairman, Foreign Committee</i> | NORMAN THOMPSON |
| F. ACHARD | E. METZELTIN |
| | E. ANDRE SCHEFER |
| | J. W. SMITH |

While the activities of the majority of our members are concerned chiefly to the building up of a large collection of locomotive photographs, there are some whose interests extend to lithographs, prints and other early material. The period of good times, previous to this depression, brought such an increase in price of some of this material that the majority of us had to forego these items from our collections. Time was when these lithographs could be purchased for a few dollars and the owner was proud of his purchase. Through the kindness of one of our members, Mr. A. Sheldon Pennoyer, we are able to reproduce such material of this nature as is in the files of Kennedy & Co., the oldest dealer of prints in this country. To this list has been added such data as we have been able, with the view of making it as complete as possible. In rearranging this material there are no doubt some duplications and no doubt some which have not been recorded. We ask the indulgence of our readers in this matter and request their co-operation if they can furnish additional items for future publication.

If any one type of locomotive ever did yeoman service on our American railroads, it was the 4-4-0, standard or American type. Used for both freight and passenger service, of varying weights, this type was easily adapted to the conditions and the service for which it was intended. At the beginning of this century, it had to give way to larger units which were more capable of handling the increasing tonnage. Mr. Warner has written a very comprehensive study of the development of this type of locomotive and I'm sure our members will value this contribution.

Articles covering briefly the history of one of our early railroads are always appreciated and the contribution of Mr. Kneiss is another story of the struggles of the early roads in California. The recollections of Mr. Curran in connection with the Grand Central Station will be of interest to all who have entered and passed out of those old and familiar portals.

Lastly, the list of Boston & Maine locomotives is rapidly drawing to a conclusion. This present installment covers the engines of the Concord & Montreal group and its leased lines. The series will be concluded next year with the Fitchburg R. R. and its leased lines. In response to the inquiry made in Bulletin No. 34, a large number of members have signified their interest in the publication of these locomotive rosters. No definite announcement can be made at this time but we hope to be able to start a new road at the conclusion of the present series.

For the information of our members, Bulletin No. 36, the special bulletin for next year and which will be ready in February, will treat of the history of the Colorado Midland Railroad.

Cover Design

Again our fellow member and artist, Mr. Kuhler has favored us with one of his sketches for our cover. Here we have the "W. A. Tower" on the Concord R. R. rushing through one of our quiet New England villages. One can almost hear the click of the rails, the sound of the exhaust and smell the wood smoke as the "W. A. Tower" tears through this little New England village, somewhere up in the Merrimac Valley! Again we wish to express our appreciation to Mr. Kuhler for his kindness in furnishing us with such a clever and interesting cover design.

The Tyrone & Clearfield Railroad

In BULLETIN No. 34, Mr. Westbay in his contribution on track gauges, made the statement which appears on page 32 that this road used a 4'-5½" gauge. One of our members, Mr. J. D. Lovell of Holidaysburg, Pennsylvania, who lives not far from this former road, took the trouble to verify this statement as the information Mr. Westbay gave was news to him.

For many years it was the custom of the railroads in the State of Pennsylvania, to file with the Auditor General of that Commonwealth, certain statistics of operation and other information as to their physical characteristics. Mr. Lovell made an examination of these reports from the years 1863-1870 inclusive and for the year 1864, this company furnished a complete report and the statement is made that the gauge is 4'-8½". Subsequent reports give the same information. Following the foreclosure in 1866, a new company, the Tyrone & Clearfield Railway Company, was organized on April 1, 1867. In none of the above mentioned reports does it give the fact that the road owned any rolling stock.

The Pennsylvania R. R. became interested in this road in 1858. The smaller road appealed to the Pennsylvania R. R. for aid in completing this twenty-three mile line and the latter company agreed to accept in payment of passenger fares and amounts due on freight traffic interchanged with that road, 60% in cash and 40% in First Mortgage Bonds, provided the amount of the First Mortgage was not to exceed \$200,000.00 and to complete the line from Tyrone to Philipsburg, Pa. The road was located in a region rich in mine and forest products and the Pennsylvania R. R. felt that it would be a valuable tributary. In 1861, under one of the terms of settlement of the litigation with the Commonwealth over tonnage tax imposed on traffic over the former state owned Philadelphia & Columbia R. R., an additional \$75,000.00 was loaned by the Pennsylvania R. R. to the Tyrone & Clearfield R. R.

In July, 1862, the Tyrone & Clearfield was leased to the Pennsylvania R. R., to be operated at cost by the latter and any profits accruing to go to the road. As the Pennsylvania held the majority of the stock and bonds, it simply reverted to them. The road was opened from Tyrone to Nuttals Coal Mine (Powelton), a distance of 16 miles.

In 1863 the road was opened to Philipsburg, Pa., a distance of 23 miles.

On Feb. 1, 1869, the road was opened to Clearfield, 40 miles from Tyrone, and on Dec. 24, 1874, the extension to Curwensville, 47 miles from Tyrone, was completed.

On August 1, 1903, the Pennsylvania & North Western R. R., Millersburg R. R., Tyrone & Clearfield Ry., Cambria & Clearfield R. R., Cresson & Irvona R. R. and the Ebensburg & Black Lick R. R. were consolidated into the Cambria & Clearfield Railway Company. The Pennsylvania R. R. owned practically all of the stock of these roads and the consolidation simplified the management of these properties.

In view of the statements as to the gauge of the track in the reports of the Auditor General and the financial interest of the Pennsylvania

R. R., it would seem unlikely that the latter would permit a gauge different than standard. Furthermore, the Tyrone & Clearfield connected with no other railroad, nor were there at that time, any other railroads projected to connect with it.

The Tyrone & Clearfield was essentially a coal carrying road. A careful examination of the reports of the Pennsylvania R. R. fails to note any change of gauge or wharves or trestles for the transferring of coal at Tyrone.

Absence of motive power, as indicated in the reports of the Auditor General, would indicate that the road was worked with Pennsylvania R. R. engines. Such lines as the Philadelphia & Erie R. R. did own locomotives and this is mentioned in these reports. The Tyrone & Clearfield is not included. The road between Tyrone and Philipsburg crosses the main range of the Allegheny Mountains on grades much in excess of those on the main line between Altoona and Pittsburgh. Even in the sixties it was customary to operate coal trains with four locomotives on the T. & C. This would involve the assignment of a large number of engines, but in none of the Pennsylvania Annual Reports do we find any mention of locomotives or rolling stock being changed for use on a 4'-5½" gauge.

On April 1, 1867, the Tyrone Division was formed of the Tyrone & Clearfield and the Bald Eagle Valley roads. In the report of 1868, on the Tyrone Division, we find that engine No. 103 made the greatest mileage in passenger service and engine No. 190 the greatest in freight service. In 1868, engine No. 103, was the former "Monroe," Baldwin, 1854, and No. 190 was formerly the "Old Dominion," Norris, 1856, the latter coming from the Philadelphia & Columbia R. R. There is no question but that both of these engines were of standard gauge.

The Bald Eagle Valley R. R. extended from Vail, three miles above Tyrone on the Tyrone & Clearfield R. R., to Lock Haven. The trains on that line, have, from the beginning, used the tracks of the Tyrone & Clearfield between Vail and Tyrone. The Bald Eagle Valley, a standard gauge road, was opened for service between Tyrone and Bellefonte on Jan. 24, 1863, and has been operated by the Pennsylvania R. R. since that date. While it is true the Bald Eagle Valley R. R. used the tracks of the Bellefonte & Snow Shoe R. R. between Snow Shoe Intersection and Bellefonte, the B. & S. S. R. R., not coming under P. R. R. control until 1881, again the reports fail to mention a third rail or other provision for handling Bald Eagle Valley trains between Vail and Tyrone.

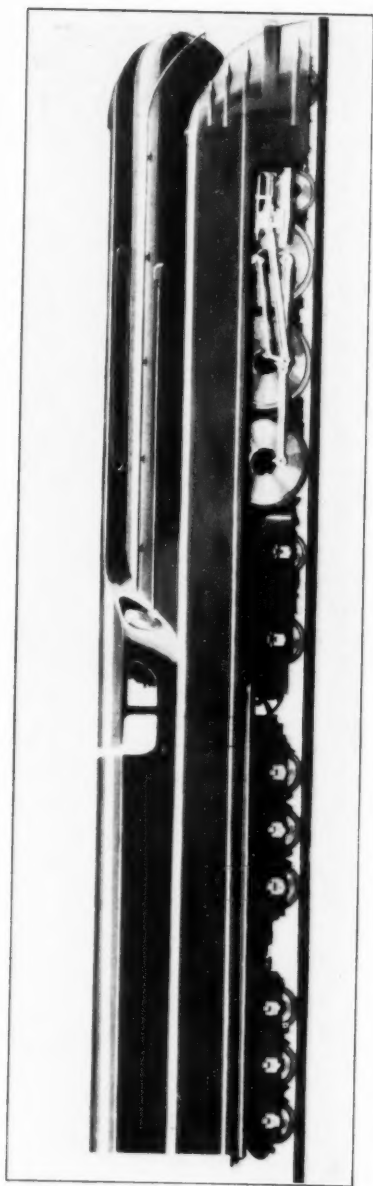
Lastly, a retired passenger conductor, 90 years of age, and with excellent mental faculties, stated that as a freight brakeman on what is now the Middle Division (Harrisburg to Altoona), he was a member of the crew that picked up at Tyrone the first cars of coal brought to that point by the Tyrone & Clearfield R. R. He stated these cars came through over the P. R. R. tracks and that after that he was on trains which frequently set out empty cars for and picked up loaded cars from the Tyrone & Clearfield R. R.

The above statements have been submitted by Mr. Lovell and we deeply regret the error made in the contribution of Mr. Westbay's. They



The Adams Streamlined Train Tried on The Baltimore & Ohio R. R. in 1900.

Courtesy of the Railway Age



Streamlining as Suggested by O. Kuhler in 1928 for Hudson Type Locomotive.

Courtesy American Locomotive Co.

represent no little time and research and we are glad to publish them to correct the former error and to give our readers the story of this little coal carrier in the Allegheny Mountains.

An Early Streamlined Train

The interest with which the railroad managers and the public have viewed the new Union Pacific and Burlington "Zephyr" streamlined trains, throughout the country and at the Chicago Fair has been unprecedented. It may interest our members to learn that an experiment with a streamlined train was tried by the Baltimore & Ohio R. R., under the direction of Mr. Frederick U. Adams in 1900.

The "Railroad Gazette," in their issue of June 8, 1900, states that five passenger cars and one baggage car were fitted up under the direction of Mr. Adams, with shields and other devices for reducing air resistance at high speeds. The cars were old ones refitted. With B & O locomotive #857, 4-4-0 type, the forty miles between Baltimore and Washington was covered in 37½ minutes. Individual miles were made in 41, 42 and 44 seconds and 4.3 miles was made at the speed of 89 miles an hour.

The account states that there was no shield on the locomotive. The tender was built to the height of the cars and there was no break between engine cab and baggage car. The car windows were flush with the sides of the cars, the car sidings ran horizontal instead of perpendicular and there were no panels. The car sides were extended downwards to cover the trucks and to prevent air from impinging against them. The platform doors extended to the bottom of the steps and were flush with the sides. The spaces between the cars were closed with a flexible connection, the roof was arched and smooth and the rear car tapered back. The train was fitted with air passages to ventilate the cars without opening the windows. Air was admitted from the front end of the tender and carried along the roof in passages which connected when the train was coupled. The fresh air was distributed from these ducts.

One of the members of this Society, Mr. O. Kuhler, has had no little to do with the streamlining of our modern motive power and equipment. One of his designs for locomotives, is reproduced herewith, through the kindness of the American Locomotive Co. The reproduction of the Adams train is reproduced through the kindness of the Railway Age.

The 4-4-0 (American) Type of Locomotive

One of the Most Successful Types of Steam Locomotives Ever Used on American Railroads

By PAUL T. WARNER.

THE 4-4-0 type of locomotive, with two pairs of coupled driving wheels and a four-wheeled leading truck, was patented by Henry R. Campbell, of Philadelphia, on February 5, 1836. Locomotives with coupled driving wheels were in use at that time, but they had no guiding trucks; and the truck had demonstrated itself to be a most desirable feature on the sharp curves and uneven tracks then prevalent on American railroads. The most satisfactory locomotive for general road service was the 4-2-0, which was built with either inside or outside cylinders, and with the single pair of driving wheels placed in front of the firebox, as in the Norris engines, or back of the firebox, as in the Baldwin engines. Such locomotives were flexible and easy on the track, but with only one pair of driving wheels their adhesion and hauling capacity were very limited.

Henry R. Campbell was an expert in matters pertaining to railroads, and he was Chief Engineer of the Philadelphia, Germantown and Norristown Railroad when that line first adopted steam power in 1832. A locomotive built in accordance with his patent was constructed by James Brooks, of Philadelphia. The work was started March 16, 1836, and was completed May 8, 1837. This machine had outside frames of wood, and inside cylinders whose pistons were connected to a crank axle on the leading pair of drivers. The boiler was of the conventional locomotive type, with a deep firebox between the driving axles. Weight was transmitted to each driving axle journal through an independent leaf spring, no equalization system being employed.

In the issue of the *American Railroad Journal, and Advocate of Internal Improvements* for July 30, 1836, there was published a letter addressed to Mr. Campbell by William J. Lewis, a civil engineer, discussing the design of the new locomotive and giving an estimate of its hauling capacity. Mr. Lewis stated the dimensions as follows:—

| | |
|---|----------------|
| Cylinders | 14x16 inches. |
| Driving Wheels, diam. | 54 inches. |
| Surface of Boiler exposed to Fire | 723 sq. ft. |
| Content of Firebox | 53 cu. ft. |
| Weight of engine with water in boiler | about 12 tons. |
| Weight on driving wheels | 8 tons. |
| Traction without wheels "sliding" | 4480 lb. |

The weights are given in tons of 2240 pounds, and the assumed ratio of adhesion is four. With a boiler pressure of 90 pounds, used by Mr. Lewis, and a mean effective pressure of 85 per cent., the tractive force developed would be practically the same as that stated above, which was based solely on the adhesion. The hauling capacity of the locomotive at a speed of 15-45/100 miles an hour, as calculated by Mr. Lewis, varied

from 450 tons on a level to 86 tons on a grade of 100 feet per mile. As compared with a typical Baldwin locomotive of the 4-2-0 type, with $10\frac{1}{2} \times 16$ -inch cylinders, the maximum tractive force of Mr. Campbell's engine represented an increase of 61 per cent.

The locomotive was placed in service on the Philadelphia, Germantown and Norristown Railroad, but proved only partially successful. It was a relatively powerful machine, but with no equalizing system between the driving springs it was too rigid to work satisfactorily on the light, uneven tracks then in use.

In 1835, the year before Mr. Campbell patented his 4-4-0 type, the firm of Garrett and Eastwick, of Philadelphia, builders of steam engines and light machinery, obtained an order for a locomotive from the Beaver Meadow Railroad. To supervise the design and construction of this locomotive, Messrs. Garrett and Eastwick engaged the services of Joseph Harrison, Jr., who was then 25 years of age, and had served as a journeyman in the Norris Locomotive Works for two years. Mr. Harrison was an excellent mechanic, and he subsequently made important improvements in locomotive design. The Beaver Meadow locomotive, which was of the 4-2-0 type, and named *Samuel D. Ingham*, after the President of the road, proved so successful that in the winter of 1836-37 the firm received an order for another, which was to weigh 15 tons—an exceptionally large engine for the period. It was of the 4-4-0 type and was appropriately named *Hercules*.

The Beaver Meadow Railroad was located in the Mauch Chunk region of eastern Pennsylvania, and was originally built for the transportation of coal from the anthracite mines to the Lehigh Canal. The line was exceedingly crooked and hilly, with maximum grades of 96 feet per mile and curves as sharp as 250 and 300 feet radius. For that period the track was of substantial construction, as it consisted of an iron plate rail measuring $2\frac{1}{4} \times \frac{5}{8}$ inches, laid on wooden stringers of oak measuring 5×7 or 5×8 inches in section. The cross-ties were placed either three or four feet between centers, depending upon the size of the stringers.

The *Hercules* included in its design two features of special interest, both patented by Andrew M. Eastwick. The first was a novel reversing device, which had been used on the *Samuel D. Ingham*. This consisted of a sliding block, interposed between the valve itself and the valve seat on the cylinder casting. The block had two sets of ports through it, one direct and the other crossed. When it was so placed that the direct ports registered with the ports in the cylinder casting, the locomotive ran forward; while, by moving the block so that the cross ports registered, the motion was reversed. The cylinders were inclined, with their pistons connected to the rear pair of driving wheels; and each valve was actuated by one eccentric permanently fixed to the rear axle.

The Eastwick patent covering this device was dated July 21, 1835, and the patent specification included a drawing of the arrangement, in which the valve is shown as having a moderate amount of outside lap and an excessive inside lap. This drawing is reproduced in the late J. Snowden Bell's book on "The Early Motive Power of the Baltimore and Ohio Railroad"; and a similar drawing, but with different lettering, is shown in the book entitled "Development of the Locomotive En-

gine," by the late Angus Sinclair. It is difficult to see how it would be possible to use a valve with the laps as shown in this drawing; and in any event, with a valve having lap and driven, as it was in this case, by a single fixed eccentric, the steam distribution would be distorted in backward motion. A German drawing of the *Gowan and Marx*—a later locomotive equipped with the Eastwick reversing device—to which further reference will be subsequently made, shows a detail of the valve, which is represented as having very little outside lap and no inside lap. This was doubtless the arrangement actually used, as any considerable amount of lap would greatly distort the steam distribution when running backward.

The second feature of special interest used in the *Hercules* was a separate frame placed under the main frame, and having pedestals which held the driving boxes. As described by Mr. Harrison, "The weight of the engine rested upon the center of the sides of the separate frame through the intervention of a strong spring above the main frame, the separate frame being held in place by a pedestal bolted to the main frame, the centers of the separate frame vibrating upon a journal sliding vertically in this pedestal."

As compared with Mr. Campbell's 4-4-0 type locomotive, this plan provided somewhat greater flexibility; but unless the inequalities were alike on both sides of the track, the framing was necessarily racked. The *Hercules*, however, worked successfully on the sharp curves and heavy grades of the Beaver Meadow Railroad, and marked a distinct step forward in locomotive development.

In 1838 Joseph Harrison, Jr., patented the system of equalization which subsequently came into universal use in American locomotive construction. Mr. Harrison had been elected junior member of the firm, the name of which was changed to Garrett, Eastwick and Company, and shortly thereafter—due to the retirement of Mr. Garrett—to Eastwick and Harrison. The original Harrison patent covered all the forms of equalization now used, and constituted one of the most valuable improvements ever made in locomotive construction.

Under date of May 9, 1839, the Committee on Science and the Arts, of The Franklin Institute of the State of Pennsylvania, issued a most interesting report on the Eastwick and Harrison locomotives. On April 25, the Committee had investigated the performance of one of these locomotives, which was under trial at Philadelphia. Unfortunately the report gives neither the name of the locomotive nor the road for which it was built. The engine is described as having 12x18-inch cylinders and driving wheels 44 inches in diameter, with a steam pressure of 90 pounds, and a weight of 18,059 pounds on the drivers. A train of 32 loaded and two empty cars, weighing with the tender, 169 tons, was hauled from Broad Street, Philadelphia, to Peter's Island, a distance of about three miles. The train was started with ease on a rising grade of 27 feet to the mile, and part of the run was over a rising grade of 35 feet to the mile, combined with several short curves. The track was in bad condition, and the equalizing beams, as stated in the report, were "in continual vibration."

A few days later, one of the members of the Committee saw this same locomotive handle a train weighing 265 tons. After proceeding about two miles, one of the cars near the middle of the train broke down; whereupon a quick stop was made by "reversing the locomotive."

The report was highly commendatory, referring especially to the system of equalization employed, and the efficiency of the exhaust. The steam was discharged into two copper chests, one connected with each cylinder; and from these chests it escaped up the stack through a number of small tubes. The report states that "with the aid of this contrivance, the anthracite fire is kept in a state of intense activity, and generates an abundance of steam, without the annoyance and danger arising from the smoke and sparks of a wood fire." The grate was composed of grooved wrought iron bars, which were protected from the intense heat of the anthracite fire by a coating of clay placed within the grooves.

The report to which reference has been made was accompanied by a reproduction of a wash drawing prepared by Joseph Harrison, Jr., and entitled "Eastwick & Harrison's Improved Locomotive Engine." Drawings based directly on this one have frequently been published as representing the *Hercules*. The drawing shows a locomotive having Harrison's equalizers, with which device the *Hercules* was not originally equipped; but according to an article by E. P. Eastwick, Jr., published in the *Railroad Gazette* of April 22, 1892, the *Hercules*, shortly after being placed in service, was partially rebuilt and fitted with equalizing beams to render it more flexible. The drawing mentioned above clearly shows the characteristic feature of the early Eastwick and Harrison locomotives, and was probably used by the firm for advertising purposes.

In the summer of 1839, the Philadelphia and Reading Railroad Company placed an order with Eastwick and Harrison for the famous locomotive *Gowan and Marx*. This engine was intended for freight service, and was of the 4-4-0 type, designed to weigh eleven tons, with nine tons on the drivers. This unusual weight distribution was obtained by placing the driving wheels close together, with the rear axle under the firebox, and using a comparatively short boiler barrel. The firebox, arranged for burning hard coal, was of the Bury or "hay-stack" pattern, about five feet long outside. The cylinders were placed on an angle, with pistons connected to the rear drivers as in the *Hercules*. Both Angus Sinclair and Joseph Harrison, Jr., give the cylinder dimensions as $12\frac{1}{2} \times 18$ inches, and the driving wheel diameter as 42 inches.* The Eastwick reversing mechanism was applied. This was the first locomotive to be equipped with a blower, and it also had the special form of exhaust previously described.

The equalizers used on the *Gowan and Marx* consisted of heavy cast iron beams placed above the frames, one on each side, with their ends bearing on round, vertical pins that rested on the tops of the driving boxes. From the center of each beam was suspended a half-elliptic spring which supported the main frame. All the drawings of the East-

*The records of the Railroad Company differ from these figures, as will subsequently appear.

wick and Harrison locomotives built up to 1842, with which the writer is familiar, show this plan of equalization.

The German drawing of the *Gowan and Marx*, previously referred to in connection with the Eastwick reversing mechanism, shows a leading truck with inside journals, and side members consisting of long inverted leaf springs. The ends of these springs rested directly on the boxes, and the springs vibrated, at mid-length, on the ends of a wrought iron bolster. The weight of the front end of the locomotive was transferred to this bolster through a center pin. Another drawing of the *Gowan and Marx*, however, made by Enoch Lewis, Jr., in 1841,* shows a truck with a built-up frame, and having a separate spring over each box. Furthermore it is stated, both by Joseph Harrison, Jr., in his book entitled "The Locomotive and Philadelphia's Share in Its Early Improvements," and by J. Snowden Bell in his work on the early Baltimore and Ohio locomotives, that the truck with the two inverted side springs was first applied to the locomotive *Mercury*, built by Eastwick and Harrison for the Baltimore and Ohio Railroad in 1842. This incident illustrates the discrepancies so often encountered when studying the history of these early locomotives.

On one of its first trips over the road, made February 20, 1840, the *Gowan and Marx* startled the railroad world by hauling a train of 104 loaded four-wheel cars, weighing 423 tons, from Reading to Philadelphia, at an average speed of 9.82 miles an hour. Including the weight of the engine and tender, the weight of the train equalled *forty times* that of the locomotive. The line was level or slightly descending, with only one opposing grade, which was 2100 feet long, rising at the rate of 26.4 feet per mile. In a report prepared by G. A. Nicolls, Superintendent of Transportation of the Railroad Company, under date of February 24, 1840, the locomotive was stated to have consumed 5600 pounds of red ash anthracite, while evaporating 2774 gallons of water. This represented an actual evaporation of 4.13 pounds of water per pound of fuel. In the same report it was stated that the *Gowan and Marx* had cylinders measuring $12\frac{1}{2} \times 16$ inches, and driving wheels 40 inches in diameter. These figures differ somewhat from those usually given in descriptions of the locomotive, and which have been previously quoted. Mr. Nicolls gave the weight of the locomotive as 24,660 pounds with 18,260 pounds on drivers, and stated that "the steam ranged from 80 pounds to 130 pounds per square inch, to which latter pressure the safety valve was screwed down." Assuming a mean effective pressure equal to 85 per cent. of 130 pounds, the ratio of adhesion would have been approximately 2.5. As the locomotive worked with a fixed cut-off, this certainly indicates that the engine was operated with a light throttle if the higher pressure was actually attained. Even when carrying a pressure of only 80 pounds, the ratio of adhesion was only 3.42. These

*Mr. Lewis' drawing shows a hook-motion reverse gear, with one eccentric on each side and a rocker having pins at the top and bottom, instead of the Eastwick reversing arrangement, which latter was undoubtedly applied to the locomotive as built.

figures are of course approximate, as the actual mean effective pressure cannot be determined.

It is interesting to compare the performance of the *Gowan and Marx* with that of the Baldwin 4-2-0 type locomotive *Neversink*, the first engine built for the Philadelphia and Reading. On March 12, 1839, the *Neversink* hauled a train of 45 cars, weighing 223 tons, from Reading to Bridgeport, a distance of 40 miles, at an average speed of $12\frac{3}{4}$ miles an hour. The *Neversink* had cylinders $10\frac{1}{2} \times 16$ inches, and driving wheels 54 inches in diameter; and the steam pressure on the run was stated by Mr. Nicolls as varying between 80 and 120 pounds. Wood was used for fuel, and the performance was rightly judged to have been highly creditable. The tests with the *Gowan and Marx*, however, fully proved the advantages of using coupled driving wheels.

The 4-4-0 type locomotives built by Eastwick and Harrison made their reputation chiefly as freight haulers. During the years 1839 and 1840, three such locomotives were built for the Baltimore and Ohio Railroad. The first of these—and probably the others also—had $12\frac{1}{2} \times 20$ -inch cylinders and driving wheels 50 inches in diameter. These were followed in 1842, by two others, described by Mr. Harrison as having been “specially designed for running passenger trains at extra fast speed.” These passenger locomotives had 14×20 -inch cylinders and driving wheels 60 inches in diameter. One of them, the *Mercury*, ran 37,000 miles during the year 1844, which is generally believed to have been the greatest annual mileage made by any locomotive up to that time.

The great success of the Eastwick and Harrison locomotives attracted the attention of the Russian Government; and in 1844, the firm closed their Philadelphia plant and transferred their activities to St. Petersburg. Their career as locomotive builders in the United States was of brief duration, but their work in aiding the development of the locomotive was of the highest value.

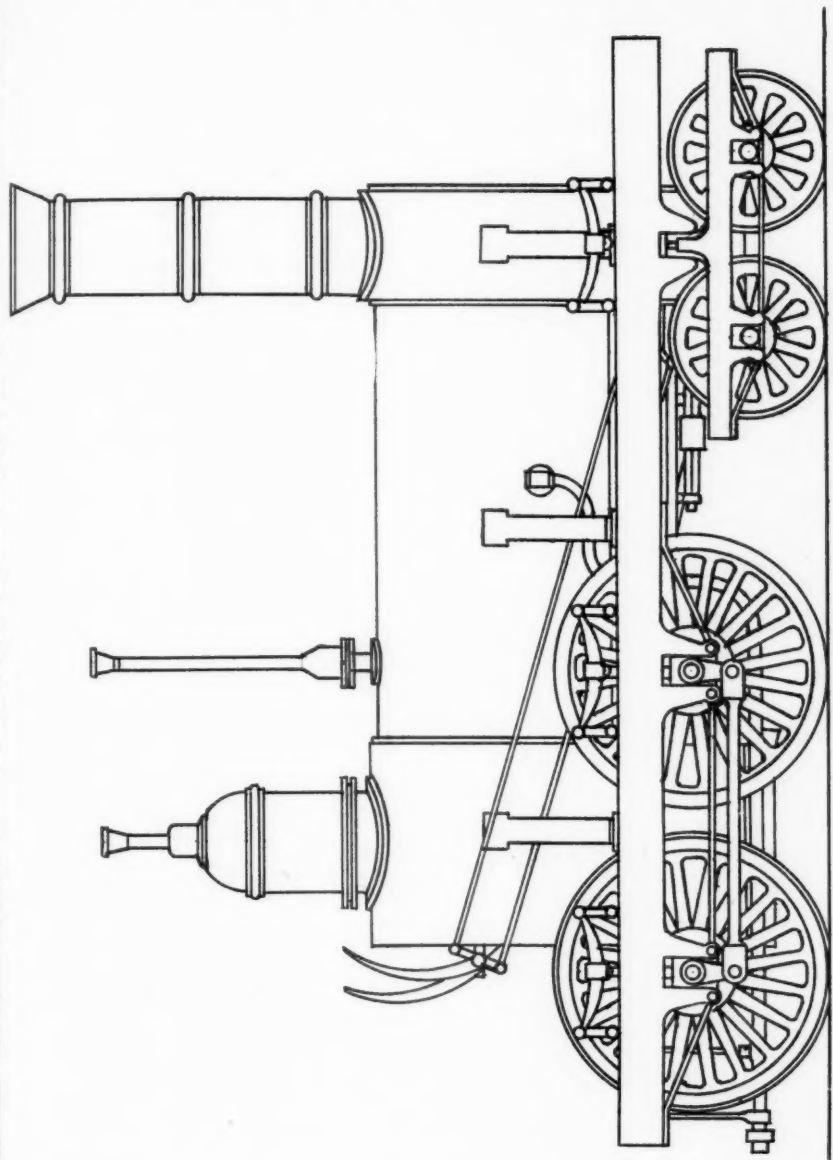
The early forties thus saw the 4-4-0 established as a successful type on American railroads, and while some builders at first failed to recognize its advantages, its use spread rapidly. Thomas Rogers, of Paterson, New Jersey, built his first 4-4-0 in 1844. Like the Eastwick and Harrison locomotives, it had inclined, outside cylinders, with the pistons connected to the rear pair of drivers. The locomotive was remarkable in that it had equalizers between the leading drivers and the truck. Shortly thereafter, Mr. Rogers increased the distance between the truck and leading drivers of the 4-4-0 type, connecting the pistons to the first pair and equalizing the driving wheel loads independently of the truck. He had progressive ideas, and in 1849 applied the Stephenson link motion to a 4-4-0 type locomotive. This was undoubtedly the first use of the link in American locomotive practice since its application by William T. James, of New York, to his little experimental locomotive built in 1832. The link motion was a great improvement over the complicated arrangements of hook motions, separate cut-off valves, and other devices that were in use at the time of its introduction.

Another important contribution of Mr. Rogers to the development of the locomotive was the wagon-top boiler, first applied to the *Madison*, a 4-4-0 built in 1850.

The Baldwin Locomotive Works, in Philadelphia, began building the 4-4-0 type in 1845. Mr. Baldwin was averse to its introduction, claiming that his six-wheeled, four-coupled type, with the leading wheels and first pair of drivers combined in a flexible beam truck, was superior. In the year mentioned, however, the South Carolina Railroad Company called on him to build some passenger engines of the 4-4-0 type, and the first one was completed in December. It had cylinders measuring $13\frac{3}{4} \times 18$ inches and 60-inch driving wheels, and weighed 15 tons. The driving springs themselves formed the equalizers, there being a long inverted leaf spring on each side, with its ends resting on vertical pins placed above the driving boxes; while the frame was suspended from the middle of the spring. The cylinders were inside-connected, and the Baldwin half-crank axle was used. With this arrangement, the wheel center itself formed the outer crank arm on each side. The general design is shown in an accompanying drawing, from which it will be seen that the inside and outside cranks on the same side of the locomotive were placed 90 degrees apart. Hence when the piston on one side was in position to exert its maximum turning effort, that effort was transmitted to the rear pair of drivers through the coupling rod on the opposite side. The drawing shows the "half-stroke cut-off," having a separate valve, operated by its own eccentric, and placed above the main valve. The upper valve, when in use, cut off the steam supply at half-stroke. It could be detached from its eccentric and held stationary in mid-position, when it was desired to work at full stroke. The main valves were operated by hook motion gear.

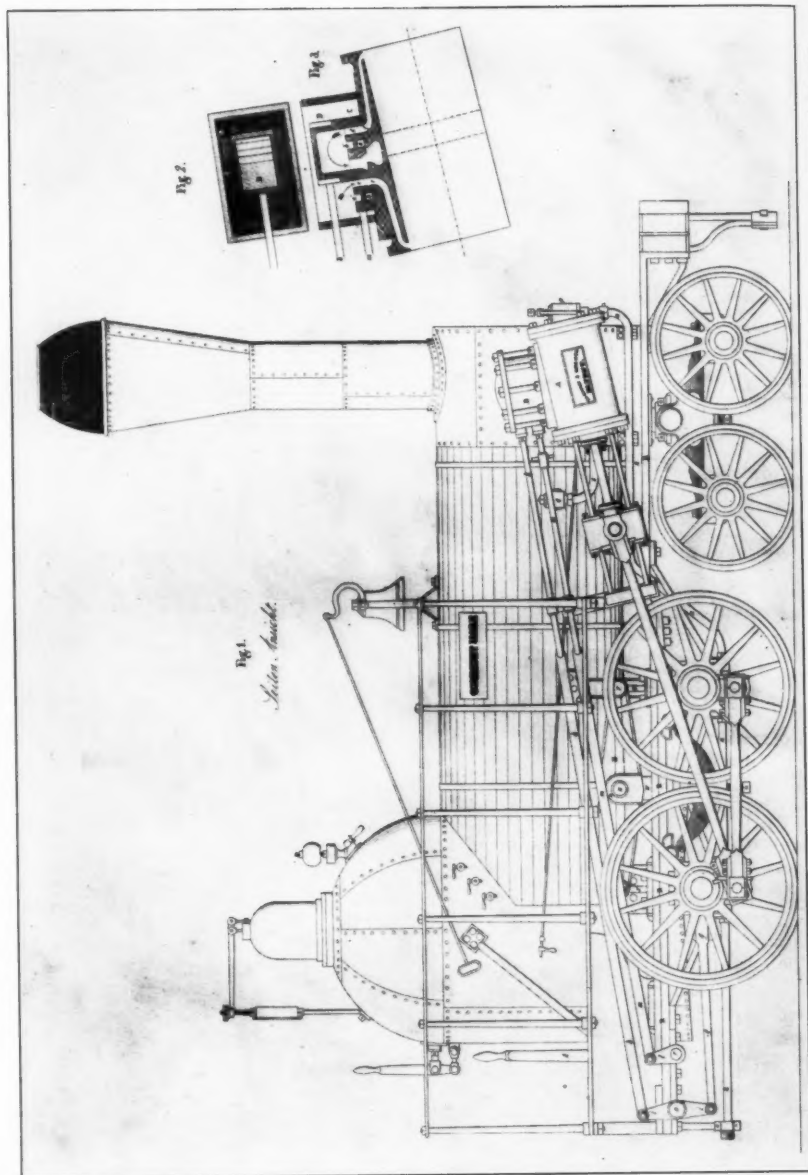
Mr. Baldwin was greatly pleased with his first 4-4-0 type locomotive, and the type immediately assumed a prominent place in his practice. He subsequently used a full crank axle, placing the cylinders in the bottom of the smokebox; and then in turn adopted outside cylinders and connections. An illustration shows such a locomotive as built in 1853, and equipped with his variable cut-off. With this arrangement, as with the previous half-stroke cut-off, the steam chest was divided into an upper and a lower chamber, in the former of which the cut-off valve was placed. This valve was actuated by a separate eccentric and rock shaft, the upper arm of which was curved to form a radius arm. On this arm a sliding block, forming the termination of the upper valve rod, could be held at various distances from the axis, thus permitting a variable travel of the upper valve and cutting off the steam at from six to 12 inches of the stroke. Under date of September 13, 1853, Mr. Baldwin patented an ingenious device for raising and lowering the block on the radius arm. The design proved satisfactory in that it provided an excellent steam distribution in forward gear, but it was difficult to maintain, and was subsequently revised and simplified. The link motion, in the meantime, was proving its superiority to the various complicated designs of valve gear in use; and in 1854 Mr. Baldwin first applied the link to a locomotive built for the Central Railroad of Georgia. Its use in his practice was rapidly extended, and in 1857 he adopted it exclusively.

The *Leopard*, one of four Baldwin locomotives of the 4-4-0 type, was built for the Pennsylvania Railroad in 1856-57, and fitted with the



The First 4-4-0 Type of Locomotive, designed by Henry R. Campbell, 1836.

Drawing based on illustrations in "Development of the Locomotive Engine"—SINCLAIR, and
"The Early Motive Power of the Baltimore & Ohio R. R."—BELL.



Philadelphia & Reading R. R. "Gowen & Mers." Eastwick & Harrison, 1839.
 Patent of Reversing Mechanism.

Courtesy of C. L. Winey.

link motion. These locomotives had straight-top boilers with two domes, and were used in fast passenger service. The use of two domes, on boilers of either the straight or wagon-top type, was quite common at the time. The photograph of engine 135 was probably taken subsequent to 1862, as it shows the locomotive equipped for coal burning, and fitted with a Laird stack instead of the wood-burning stack originally applied. A number of other changes are apparent, but as far as the basic design is concerned the locomotive is shown as originally built.

In the meantime, the 4-4-0 type was undergoing an interesting development in New England. In this development the master mechanics of the leading roads took an active part. Prominent among them was George S. Griggs, head of the Mechanical Department of the Boston and Providence Railroad. In 1845, the year in which Mr. Baldwin built his first 4-4-0 type, Griggs built a locomotive named the *Norfolk* which attracted considerable attention. It was an inside connected 4-4-0, with 14½x18-inch cylinders and driving wheels 55 inches in diameter. It operated with a fixed cut-off and was equipped with drop-hook valve gear, the hooks being raised and lowered by means of cams. The boiler contained 116 copper tubes, 1¾ inches in diameter and 9 feet 6 inches long. The grate area was 8.75 square feet and the total heating surface 550 square feet. The weight on drivers was approximately 20,550 pounds, and the total weight 34,440 pounds.

The New England builders and master mechanics were for a time very partial to inside connected locomotives. The art of counterbalancing was but imperfectly understood, and the inside connected engine, with reciprocating parts well in toward the center line, ran with less oscillation than the outside connected. Septimus Norris, in his little book entitled "Norris's Handbook for Locomotive Engineers and Machinists," published in Philadelphia in 1854, has this to say regarding crank axles:—

"The cranked axle is made of wrought iron, with two cranks forged upon it, towards the middle of its length, at a distance from each other answerable to the distance between the cylinders; bosses are made on the axle for the wheels to be keyed upon, and there are bearings for the support of the framing. The axle is usually forged in two pieces, which are then welded together. Sometimes the pieces for the cranks are put on separately, but those so made are liable to give way."

Differences of opinion on the relative merits of inside and outside connected locomotives gave rise to much discussion; and as more satisfactory methods of counterbalancing the latter were developed, the inside connected machine steadily lost ground. The "American Railroad Journal," during the year 1853, presented much editorial comment on this subject, and the following advantages of the outside connected plan were particularly stressed:—

A reduction in the height of the boiler above the rails, amounting in many cases to nearly one foot.

The weight, expense, friction and danger of the double crank were dispensed with.

The power was more directly applied, with consequent mechanical advantages.

The machinery was reduced in weight and rendered more accessible. A better design of valve motion was permitted, and the design of the locomotive was simplified.

The furnace could be lengthened; an important consideration where a short driving wheel base was necessary.

Hinkley and Drury, proprietors of the Boston Locomotive Works, commenced building inside connected locomotives in 1841, and for the succeeding ten years were strong advocates of the type. A typical Hinkley 4-4-0 type passenger locomotive of 1853, having inside connections and weighing about 22 tons, was of the following dimensions:—

| | |
|---------------------------------------|----------------------------------|
| Cylinders | 15" x 20" |
| Driving wheels, diam. | 66" |
| Boiler, diam. | 42" |
| Tubes— | |
| Number | 131 |
| Diameter | 2" |
| Length | 10' x 4" |
| Firebox, length x width, inside | 40" x 40" |
| Grate area, sq. ft. | 11.5 |
| Heating surface—sq. ft.— | |
| Firebox | 64.5 |
| Tubes | 709.0 |
| Total | 773.5 |
| Tender, capacity | 1¼ cords wood 1700 gal. water |

The boilers of these locomotives were of Lowmoor or Pennsylvania iron, and the tubes were of brass. Lowmoor iron was used for much of the "running work," and Bowling iron for the tires.

The middle fifties saw the advantages of the outside connected locomotives so fully recognized that, subsequent to 1855, very few inside connected locomotives with crank axles were built in this country.

The early fifties witnessed the construction of a number of 4-4-0 type locomotives with very large driving wheels. Particularly true was this on the Hudson River Railroad, which operated locomotives with wheels as large as seven feet in diameter. This road was practically level, and trains often attained a speed of 60 miles an hour; while an average speed of 50 miles an hour was sometimes maintained for the entire distance between New York and Albany (143 miles). The use of such large wheels, however, was subsequently abandoned; and many locomotives were partially rebuilt with smaller drivers. It was becoming realized that large wheels could not be successfully utilized without ample boiler capacity; and many of the locomotives built during the late forties and early fifties were exceedingly deficient in grate area and heating surface—especially the former. The New York and Erie Railroad, for example, had in service two Norris engines of the 4-4-0 type which had 14x32-inch cylinders and driving wheels 84 inches in diameter. They were but little used; because with insufficient boiler power and an excessively long stroke, they could hardly make more than 20 miles an hour.

The New York and Erie, at that time, had a gauge of six feet, and its locomotives ranked among the largest in use. The heaviest 4-4-0 type engines weighed nearly 60,000 pounds, and were inside-connected, with 17x20-inch cylinders and driving wheels 60 inches in diameter. Similar locomotives, used in the fastest passenger service, had 72-inch drivers.

During the forties and early fifties, much attention was given to providing adequate protection for the engine crew. While there are a few lithographs of locomotives built as late as 1851 that show simply an open platform surrounded by a railing, there is no doubt that by that time the use of a cab, in new construction, was common practice. Mr. Baldwin first applied cabs of crude design in 1846, but previous to that date the cab had appeared in New England, where the severity of the climate necessitated some protection for the crew.

Locomotive builders continued to multiply; and up in Taunton, Massachusetts, William Mason, who had made a name for himself as a builder of cotton mill machinery, entered the field. Mr. Mason felt that much could be done to improve the appearance of the locomotive and refine its details; and in this he succeeded so well that he soon set the pace for other builders the country over. His first locomotive was the *James Guthrie*, built in 1852 for the Jeffersonville Railroad of Indiana. It had cylinders measuring 13½x22 inches, and driving wheels 66 inches in diameter; and attracted much attention because of its excellent design, fine workmanship and handsome appearance.

At the time Mason entered the field, it was common practice to use a short wheelbase truck, incline the cylinders, and bolt them to the sides of the smokebox. Mr. Mason spread the truck wheels and placed the cylinders horizontally, with their vertical center line corresponding with the stack center. He used a round smokebox, supporting it on a substantial saddle casting; the cylinders, saddle and front frames being securely bolted together, thus forming a strong construction. Each steam chest was made with a goose-neck extending into the smokebox, and there connecting with one of the live steam pipes. The exhaust connections were cored in the saddle casting. The driving wheels were cast with hollow spokes and rims, lead being poured into the rim opposite the crank-pin to provide counterbalance. A well-designed link motion was applied, with the links suspended, from above, on hangers proportioned to reduce the slip of the link blocks to a minimum. Mr. Mason preferred the straight or slightly coned boiler to the wagon-top form. He paid close attention to symmetry of outline, beautifying the locomotive by removing the excess of ornateness and decoration so much in vogue at the time.

Mention should also be made of the work of James Millholland, who in 1848 was appointed Master of Machinery of the Philadelphia and Reading Railroad. Millholland's earlier attempts to design boilers suitable for burning anthracite were not entirely successful, but he was a genius who profited by his mistakes and did much work of value in the development of the locomotive. His *Hiawatha* class of 4-4-0 type locomotive, built in 1859 for passenger service, was an excellent design. In it, the firebox was placed above the frames and extended back over the

rear driving axle to provide sufficient grate area. The cylinder castings met on the center line of the locomotive; they were securely bolted together and also to the frames, and provided a flat bed on which the smokebox rested. The boiler of the *Hiawatha* had two domes, the steam supply being drawn from both and controlled by a balanced throttle valve placed in the front dome. Other interesting features included underhung springs, and an excellent design for shifting link motion.

The period of the fifties thus witnessed a marked advance in the design of the 4-4-0 type, and a practical standardization of its principal features became evident in the product of the best builders. By the close of the Civil War this standardization was all but complete, and except in relatively minor details there was little to choose between the 4-4-0 type locomotives turned out by the various works. The most conspicuous features, basic to practically all designs, were the following:—

Outside, horizontal cylinders, with pistons connected to the leading pair of driving wheels.

A simple design of Stephenson link motion, actuating plain slide valves through the intervention of rock shafts; the steam chests being placed above the cylinders.

A wide-spread truck supporting the front end of the locomotive.

Frames of forged iron, of the bar type, with pedestals forged solid or bolted on, and separate front sections bolted and keyed to the main sections.

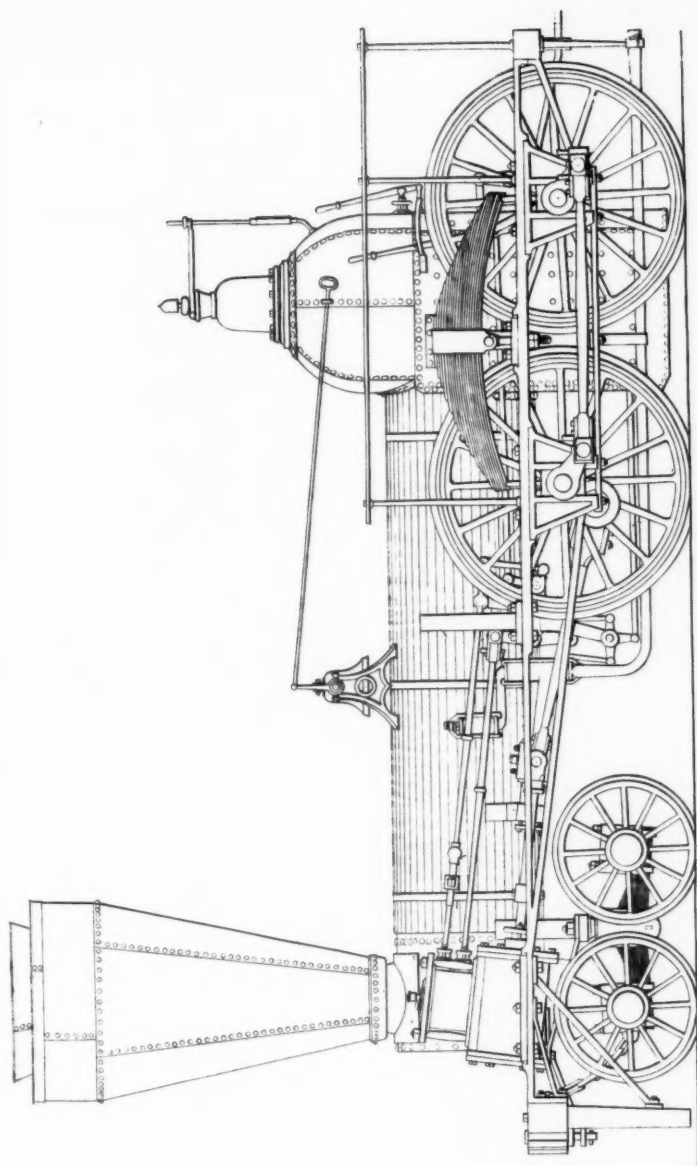
A round smokebox, resting on, and securely bolted to, a suitable saddle casting. In some cases the saddle was cast separate from the cylinders (three-piece construction); while in others each cylinder was cast in one piece with a half-saddle (two-piece construction). The latter design was probably developed by the Baldwin Locomotive Works, and was subsequently adopted by other builders. The cylinders, frames and saddle were securely bolted together.

A boiler of either the straight or wagon-top type, with a deep firebox between frames and driving axles for burning wood or bituminous coal, and a long firebox above the rear driving axle for burning anthracite coal. During the sixties, inside fireboxes of steel began to replace those of iron or copper, and steel, instead of iron, gradually came into use for boiler shells. Iron replaced brass and copper as a material for tubes.

The provision of a sufficient amount of grate area and heating surface to insure free steaming; as the need of supplying ample boiler capacity for the work to be done, was becoming generally recognized.

A great improvement in the appearance of the locomotive and the symmetry of its outline, the various builders following the lead of William Mason in this respect.

The 4-4-0, on account of the extent to which it was used in the United States, became known as the "American" Type; and because of its safety on the track, and the ease with which it could be maintained, was proving a most satisfactory "all-around" locomotive at a time when railroad mileage was rapidly extending, and when the excellence of track construction and surface, now recognized as standard on the leading roads, was conspicuous by its absence. From the Civil War until the close of the Century, the 4-4-0 type increased greatly in weight and capacity, but changed little in its basic design.



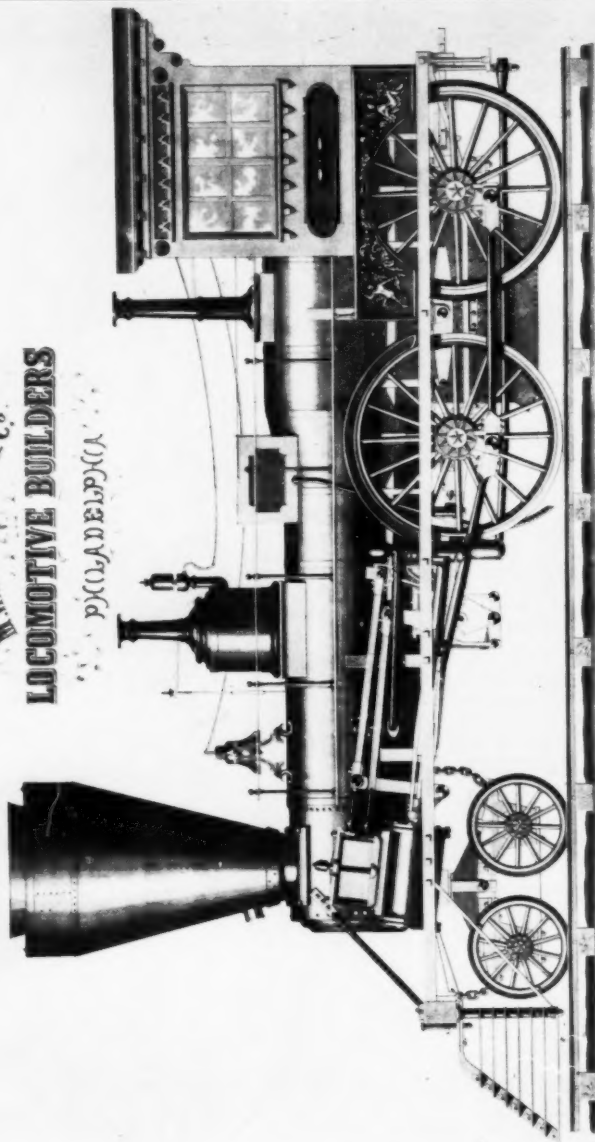
C
M W BALDWIN'S *Locomotive Engine* FOR PASSENGERS

PATENT

Baldwin 4-4-0 Type of 1845.

Courtesy of C. L. Winery.

J. & W. BALDWIN & Co.
LOCOMOTIVE BUILDERS
 PHILADELPHIA



9054 A

Baldwin 4-4-0 Type with Variable Cut-off, as Built in 1853.

Courtesy Baldwin Locomotive Works.

The period of the fifties and sixties marked the extensive introduction, on many roads, of bituminous coal in place of wood for locomotive fuel. Great ingenuity was exercised in the designing of special types of coal burning boilers, such as the Dimpfel, Boardman and Pfleger; but these were all short-lived. George S. Griggs, on the Boston and Providence Railroad, did valuable work in connection with the use of coal fuel when he introduced the brick arch and the so-called "diamond" stack. That was about 1857, when coal was first used on the road.

In his important work on Locomotive Engineering, which was published in England during the sixties, Zerah Colburn makes some interesting comments on American locomotive practice. At that time, given typical British and American locomotives of approximately equal weights, the latter were usually inferior as far as boiler capacity was concerned. Colburn explained this as due to the comparatively slow speeds at which American trains were run. No express train was timed at an average speed of more than 32 miles an hour, or at a speed exceeding 27 miles an hour on a run of 300 or more miles; although stops were longer and more frequent than on English lines. The very excellent plates which accompanied Mr. Colburn's work included drawings of only one American locomotive—a Rogers engine of the 4-4-0 type, with 16x24-inch cylinders and driving wheels 68 inches in diameter. The truck used on this locomotive was of the Bissell type, with double inclined slides; and it was equipped with a radius bar, which fulcrumed on a pin placed some distance back of the rear truck axle. The swingbolster truck, as now extensively employed, was also coming into use. The Baldwin Locomotive Works first applied it in 1867, to some 4-4-0 type locomotives built for the Pennsylvania Railroad; but it may have been used by other builders previous to that date.

The latter sixties and early seventies thus saw the 4-4-0 developed into an efficient and thoroughly satisfactory "all-around" type, admirably fitted to meet the requirements of the day. The Ten-wheeled (4-6-0) type had been employed in heavy freight service for 20 years or more, and the Mogul (2-6-0) and Consolidation (2-8-0) types were gradually being adopted for similar work, especially on roads which moved a heavy coal or mineral traffic at slow speeds. But on comparatively level lines, where freight could be hauled at fair rates of speed, the 4-4-0 type was still used in all classes of road service.*

A General Catalog published by the Baldwin Locomotive Works in 1872 offered several sizes of the 4-4-0 type and gave, for each cylinder diameter, a choice of driving wheel diameters covering a range of about ten inches, and also a choice of either a 22-inch or 24-inch stroke. It was explained that the large wheel and short stroke were preferable for passenger service, and the small wheel and long stroke for freight. With the same weight on drivers this would, of course, mean a wide range in

*In 1872, a year in which there was a great demand for railroad motive power, 60% of the locomotives built by the Baldwin Locomotive Works for domestic road service were of the 4-4-0 type; 38% were six-coupled (2-6-0 and 4-6-0 types), and 2% were eight-coupled (2-8-0 type).

the ratio of adhesion. For cylinders 17 inches in diameter, this ratio varied between 3.28 and 4.20. Based on present-day knowledge of the subject, the freight locomotives must have been very "slippery."

In the "Railroad Gazette" of December 23, 1871, there was illustrated and described a Baldwin standard 4-4-0 type engine of the period, which was so typical of the best practice of the day, that it may well be referred to in some detail. This locomotive had 16x24-inch cylinders and driving wheels 60 $\frac{3}{4}$ inches in diameter. The boiler was of the straight-top type, with two domes, one over the firebox and the other just back of the smokebox. The builders favored this form of construction, arguing that it was stronger than the wagon-top design, and that dryer steam was obtained from the forward part of the boiler, where the ebullition was less violent than over the firebox. A balanced throttle valve was placed in the front dome. The boiler barrel was built of $\frac{3}{8}$ -inch iron plates, Pennsylvania cold-blast charcoal iron being specified. The horizontal seams, and the seam at the junction of the waist and firebox, were double-riveted. The tubes were of iron, with copper ferrules at the firebox end, and the firebox was of the "best homogeneous cast steel." The crown sheet was flat, stayed by crownbars, and the stay-bolts in the water legs were spaced not over 4 $\frac{1}{2}$ inches between centers.

Certain other details deserve mention. The cylinders were of cast iron, reversible and interchangeable, and each made in one piece with a half-saddle. Cast iron was used for the driving wheel centers, which had hollow spokes and rims. All axles under the locomotive and tender were of the best hammered iron, as were also the main and side rods. The crank pins and springs were of cast steel.

The frames were iron forgings, with separate front sections, bolted and keyed in place. Each main frame was forged in one piece with the pedestals and braces. The pedestal shoes and wedges were of cast iron.

All the principal parts were accurately fitted to gauges, to insure interchangeability in locomotives of duplicate design. This method of construction had been developed by the Baldwin Works during the sixties, and its use soon became practically universal. Movable bolts and nuts, and wearing surfaces of steel or iron, were case-hardened. All wearing brasses were of ingot copper and tin, mixed in the proportion of seven parts of the former to one of the latter.

The accompanying illustration of the *Camden*, a Baldwin engine built for the Camden and Atlantic Railroad in 1871, represents a typical passenger locomotive of the period. The *Camden* had 17x22-inch cylinders, and driving wheels 66 inches in diameter. The boiler was jacketed with Russia iron secured by brass bands, and the cylinders, steam chests, and steam domes had brass casings. The cylinder head covers and steam chest mouldings were of the same material. The wheels were painted red, and the tank was "wine color." This elaborate scheme of decoration was much in vogue 60 years ago.

The accompanying table presents particulars of representative 4-4-0 type locomotives built during the seventies. These locomotives, in the majority of cases, were designed in accordance with the standards of

their respective builders. The locomotives for the Pennsylvania and the New York Central were designed by the Motive Power Departments of those roads. A Pennsylvania locomotive, suitable for burning bituminous coal, was built by the Baldwin Locomotive Works in 1876 and exhibited at the Centennial Exhibition held during that year in Philadelphia, but it was constructed throughout to drawings furnished by the Railroad Company. In 1868, the Pennsylvania had developed standard designs for its motive power, and while several classes of 4-4-0 locomotives were included, that exhibited at the Centennial was built in larger numbers than any other. It was the "general utility" locomotive of the railroad, and proved its efficiency in both passenger and fast freight service. The hard coal burner listed was of similar design, but with a long firebox placed above the rear driving axle to provide the needed grate area. The boilers of these locomotives were built of steel plate throughout.

The Centennial Exhibition Catalog published by the Baldwin Locomotive Works contained a drawing of the Pennsylvania passenger locomotive exhibited, together with a statement showing the character of the work these engines were doing. The heaviest trains handled consisted of 12 cars weighing, fully loaded, 336 tons. Such a train was handled on the 132-mile east-bound run from Altoona to Harrisburg, where the line is level or slightly descending, at an average speed of 35.3 miles an hour, with no intermediate stops. West-bound on this same division the "Limited Mail," composed of six cars weighing, loaded, 171 tons, maintained an average speed of 37.7 miles an hour. Water was scooped while enroute, from track tanks.

The average coal consumption of these locomotives varied from 3.8 to 8.4 pounds per car-mile. The former figure applied to heavy trains operating on the Philadelphia Division, which had undulating grades reaching a maximum of 40 feet per mile east-bound and 49 feet west-bound. The high figure was recorded with five-car trains on the Pittsburgh Division, where the maximum grades, east and west-bound, were respectively 52 and 95 feet per mile.

The locomotive for the New York Central and Hudson River Railroad was designed by William Buchanan, Superintendent of Motive Power, and included in its design several features of interest. Each frame was forged in a single piece, including the front rail, which was in the form of a slab two inches wide and six inches deep. Instead of casting each cylinder in one piece with a half-saddle, a three-piece construction was used, each piece being extended upward to form part of the saddle on which the smokebox rested. The steam and exhaust passages for each cylinder were cored in the corresponding casting, and the central piece contained no piping. Another interesting feature was the firebox, which contained a "water-table" as patented by Mr. Buchanan and extensively used on the locomotives of the New York Central. This was an inclined table, or water space, connecting the front and back water legs, and sloping toward the front. It divided the firebox into upper and lower compartments, communication being provided by an oval-shaped opening in the table, measuring 17x22 inches.

The purpose was to thoroughly mix the gases from the fire while they passed through the opening, thus aiding combustion and reducing smoke. The idea was ingenious, but a brick arch of the usual design would probably have been more effective.

Locomotives of this design, in fast passenger service between New York and Albany (143 miles), handled six-car trains at an average speed of $37\frac{1}{2}$ miles an hour. The coal consumption averaged $28\frac{3}{4}$ pounds per mile, or $4\frac{3}{4}$ pounds per car-mile.

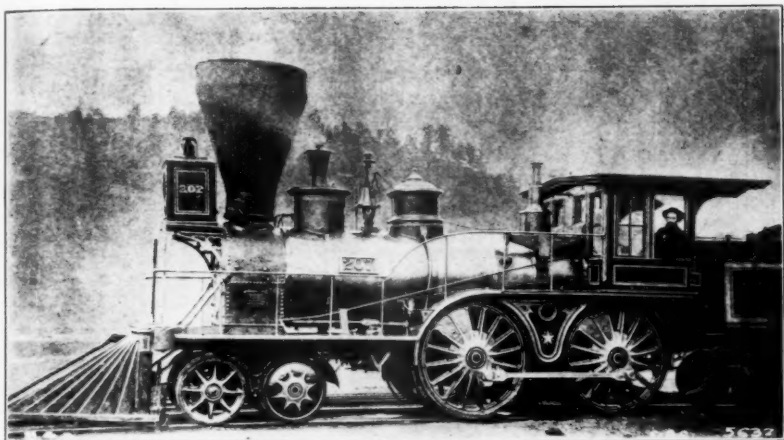
In the early eighties, two prominent eastern roads placed in service new locomotives of the 4-4-0 type that were of unusual interest. These were the Class K (subsequently D6) locomotives on the Pennsylvania, and the first of the 4-4-0 type with Wootten boilers on the Philadelphia and Reading. Both were built in the shops of the railroad companies.

The Pennsylvania locomotives were designed under the supervision of Theodore N. Ely, at that time Superintendent of Motive Power, and were placed in service between Jersey City and Philadelphia, on the New York Division, a run of $88\frac{1}{2}$ miles. The fastest schedules allowed one hour and 50 minutes, representing an average speed of 48.3 miles an hour, with three intermediate stops. A typical train was made up of five cars, and weighed about 130 tons. To successfully do such work, the new class had driving wheels 78 inches in diameter; and the tractive force was approximately 100 pounds per pound of mean effective pressure on the pistons. Anthracite was used for fuel, and the firebox was placed above the frames. With this arrangement the driving springs were underhung in a manner similar to that used by James Millholland, on the Reading, and previously described. The boilers of the new Pennsylvania locomotives were built of steel plate throughout, and carried a pressure of 140 pounds.

The machinery of these locomotives was well designed, and represented advanced practice. Special features included "alligator" type crossheads, working in two-bar guides; main rods with forked-end stubs at the back; side rods of I-section, with solid-end stubs; and a steam-operated reverse gear. This last-named device was considered necessary on account of using a pressure of 140 pounds with plain slide valves; but subsequently, with the adoption of balanced valves, the power gear was discarded.

The Class K locomotives were handsome in appearance, and this was largely due to an entire absence of the ginger-bread and decoration that, for many years, had characterized much of the motive power used in the United States. The dome casing had a hemispherical top, and in lieu of a sand-box mounted over the boiler, two boxes were placed in the driving-wheel covers. The stack was of an exceedingly neat design, with planished iron body and cast iron base and top.

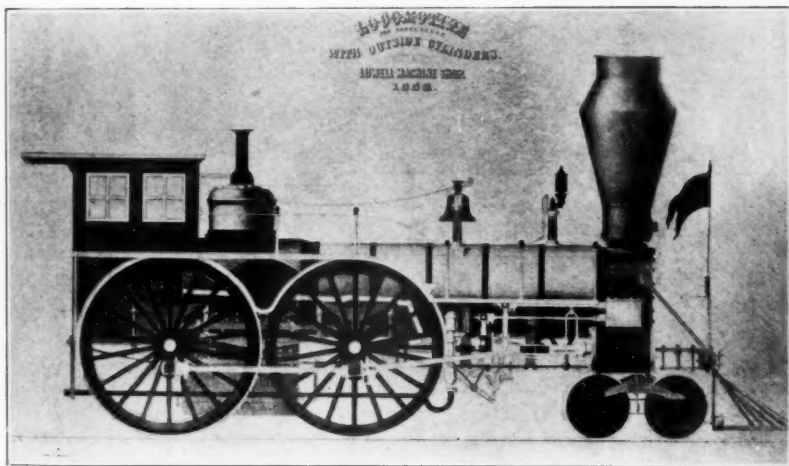
The first of the Class K locomotives was completed March 25, 1881, and a total of 18 were built, the last being placed in service in 1883. Contemporary with this fine group, and also immediately succeeding it, were several other classes of 4-4-0 type locomotives which showed many similar characteristics in design. Most notable among these was Class P (subsequently D11a), which is described in table II.



Baltimore & Ohio R. R. #207—"Dutch Wagon".

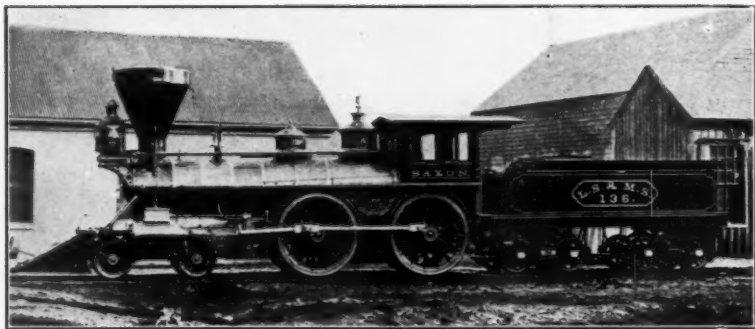
Courtesy of C. B. Chaney.

Built by Murray & Hazelhurst, Baltimore in 1854. 15x20", 60", 56,000 lbs. Weight. Designed by Samuel J. Hayes, Master of Machinery.



Courtesy of C. B. Chaney

Hudson River R. R. "Columbia." Lowell Machine Shops, 1852. Fast passenger engine—16x24" 84"



L. S. & M. S. "Saxon". Mason, 1872. A Typical Mason Engine.

Built by Philadelphia and Reading Railroad Co.

1880.



Drawing by J. Snowden Bell. Courtesy of C. B. Chaney

Philadelphia & Reading R. R. #411.

One of the first of this type with the Wootten Firebox built at the Reading Shops, 1880.

The locomotives for the Philadelphia and Reading were notable as being the first passenger engines to be fitted with the Wootten boiler for burning waste anthracite fuel. This boiler had been introduced by John E. Wootten, General Manager of the road, in 1877; and a freight locomotive of the 4-6-0 type, equipped with it, had been exhibited at the Paris Exposition of 1878. Doubts were expressed as to the wisdom of using the Wootten boiler on passenger locomotives, as the firebox was placed entirely above the drivers and, with wheels of large diameter, the boiler had to be placed at what was then considered an excessive height above the rails. No difficulty was experienced on this account, however, and the locomotives proved speedy and reliable.

Engine 411, shown in an accompanying illustration, was typical of the early Wootten passenger locomotives. The firebox was 96 inches wide and 114 inches long inside, and it had a combustion chamber extending forward into the boiler barrel. A raised water space and a brick wall were placed across the throat of the combustion chamber. The firebox was only $34\frac{1}{4}$ inches deep, and the crown sheet was horizontal. The roof sheet, however, sloped toward the rear, thus restricting the steam space at the back, and causing the radial crown stays to enter the roof at an angle. The mud-ring was built of flanged plates, in section like an inverted U. It was supported on vertical expansion links, two at the front and two at the back. The dome was forward of the firebox and was housed in the cab, which was placed over the middle of the boiler. The boiler shell was of iron, with all seams double-riveted; and the tubes were of the same material. The inside firebox was of steel.

The frames were of peculiar construction, each main frame consisting of two rolled bars placed a sufficient distance apart to permit the driving pedestals to be bolted into place between them. The cylinder castings were bolted together on the center line, but were not extended upward to form a saddle for the support of the smokebox. Instead, the smokebox walls were brought down and bolted to suitable flanges formed on the cylinder castings; a construction closely similar to that used by Millholland over 20 years previously. The smokebox was short, and it contained a nozzle $5\frac{3}{4}$ inches in diameter, the effective area of which could be varied by raising or lowering a plug, controlled from the cab. The slide valves had an outside lap of $1\frac{1}{8}$ inches, and were set with the long travel of $6\frac{3}{4}$ inches.

These locomotives had cylinders of the unusual dimensions of 21x22 inches, the cylinder volume (without including clearance space) thus being 8.80 cubic feet. With driving wheels $68\frac{1}{2}$ inches in diameter, the piston speed, at 60 miles an hour, was about 1080 feet a minute. The locomotives were used on the Philadelphia-New York run, where the fastest schedule allowed 62 minutes for the 55 miles between Wayne Junction and Bound Brook. At full power, 53 pounds of anthracite were consumed per minute, and 55 gallons of water were evaporated. The maximum speed noted was 72 miles an hour for a distance of eight miles. On one occasion, a train of 15 passenger cars was hauled from Wayne Junction to Bound Brook in 76 minutes.

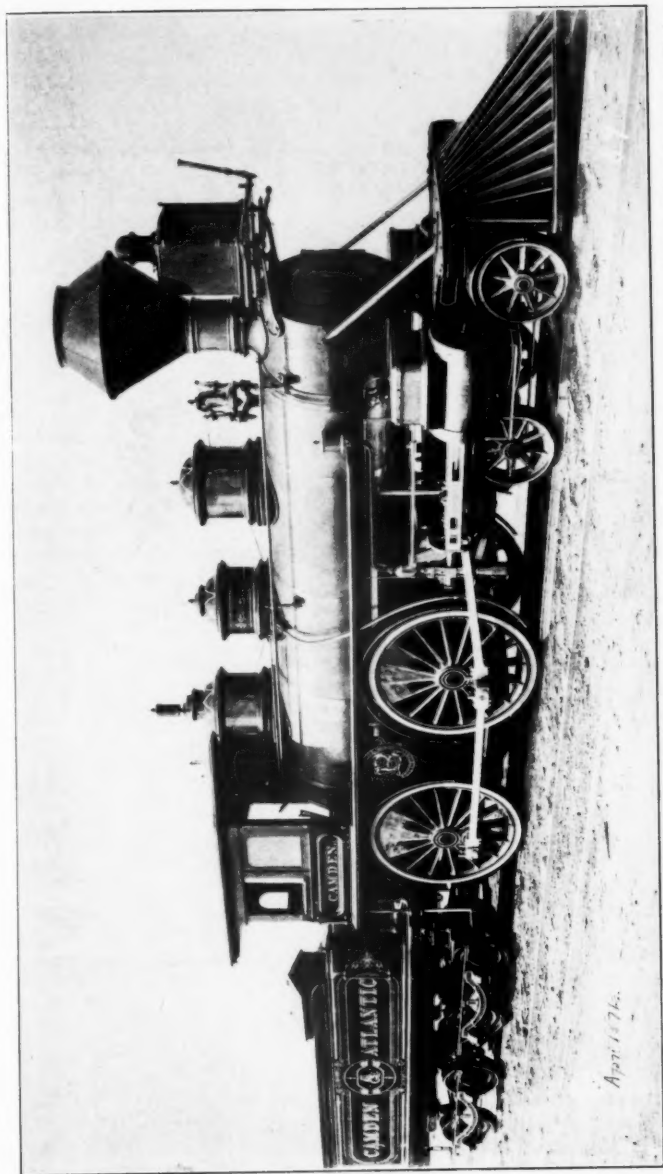
The Wootten boiler was subsequently much improved by making the roof sheet horizontal, substituting a solid wrought iron mud-ring for the original flanged design, and removing the raised water-space at the throat of the combustion chamber. Other roads in the anthracite region adopted it, and it proved a great success and an important source of economy in burning grades of fuel that could not be used in fireboxes of the conventional type. The narrow firebox hard-coal burner, however, continued to be built in considerable numbers during the eighties, and many fine examples were placed in service on the Lehigh Valley, Central of New Jersey, Lackawanna, and other lines. Lump anthracite was used for fuel, and in the largest 4-4-0 type locomotives the firebox, placed above the frames, was eleven feet in length, providing a grate area of about 38 square feet.

Up to 1890, the majority of the large soft coal-burning 4-4-0 type locomotives were built with deep, narrow fireboxes placed between the frames and driving axles. The rigid wheel-base was lengthened to approximately nine feet, so that it was possible to obtain a grate area of about 18 square feet. A group of locomotives built by the Baldwin Locomotive Works in 1888 for the New York, New Haven and Hartford Railroad, represented the typical big eight-wheeler of the period. These locomotives, which are listed in Table II, were used in both passenger and freight service. To provide as much room as possible for the firebox, the drivers were spread nine feet two inches between centers. The ratio of grate area to heating surface was as one to 97. The grate area was clearly the limiting factor in determining the ultimate capacity of this design, and any increase in power could be obtained only by lengthening the firebox and placing it above the rear driving axle, as in the case of the hard coal burners—a construction which soon became general in the largest 4-4-0 type locomotives designed for burning bituminous coal.

Reference has been made to the use of driving wheels 78 inches in diameter on the Pennsylvania's Class K (D6) locomotives built in the early eighties. While these engines were successful in the particular service for which they were designed, they were not suitable for all-around work; and therefore in Class P (D11a) which followed them, and which was built in far larger numbers, the wheel diameter was reduced to 68 inches. Up to the early nineties, this size wheel was very popular in fast passenger locomotives of the 4-4-0 type. M. N. Forney, in his excellent article on locomotives and cars, published in "The American Railway,"* states that the use of excessively large driving wheels had been abandoned, and that six feet was then about the limit of their size in the United States.

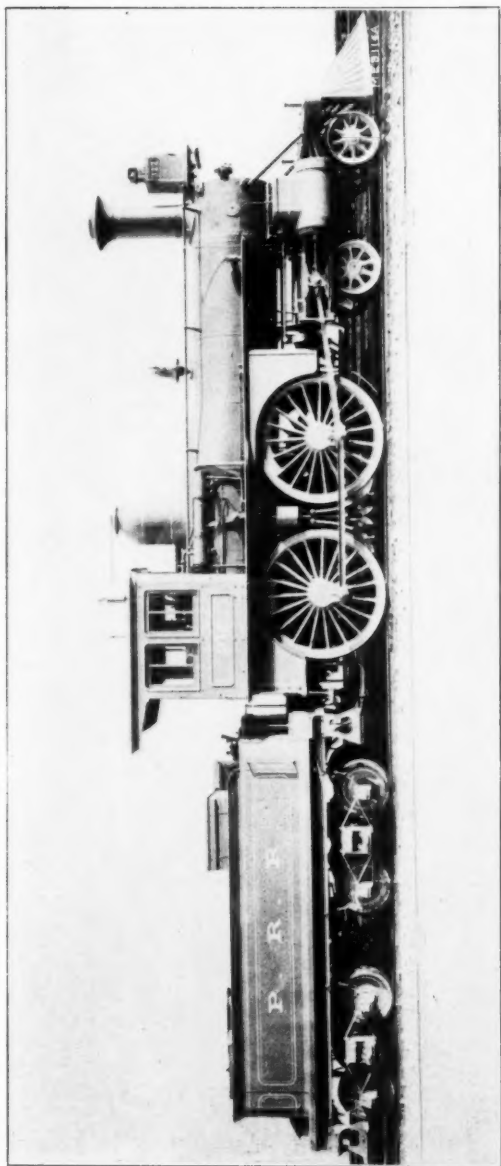
In 1889, the Baldwin Locomotive Works built their first compound locomotive—engine 848 for the Baltimore and Ohio Railroad. This was a 4-4-0 type with a long firebox placed above the rear driving axle and between the frames. The cylinders were of the Vaucelain type, with one high-pressure and one low-pressure on each side, placed one above the other. This was probably the first 4-4-0 type compound built in the

*Scribner's, 1889.



Camden & Atlantic R. R. "Camden." Baldwin, 1871. Typical Baldwin Engine with Straight Boiler and two domes.

Courtesy Baldwin Locomotive Works



P. R. R. #317, Altoona, 1881. Class "K". Built for Fast Passenger Service. Courtesy Pennsylvania R. R.

United States. During the subsequent 15 years, many compound locomotives of both the four and two-cylinder types were constructed by various builders; but the use of compound cylinders on locomotives having the 4-4-0 wheel arrangement was comparatively rare, the great majority of such engines having single-expansion cylinders.

A notable feature during the eighties was a marked increase in steam pressure. During the seventies, pressures averaged 120-130 pounds; the latter figure being practically standard in 1880. The use of 140 pounds' pressure, as carried on the Pennsylvania's Class K (D6) locomotives and the first Wootten passenger engines on the Reading, was exceptional. But during the period 1880-1889 there was a steady advance until, at the latter date, 160 pounds was becoming fairly common in new construction.

One of the strongest advocates of higher boiler pressures was James N. Lauder, who in 1884 was appointed Superintendent of Motive Power of the Old Colony Railroad. One of his problems was to design power capable of hauling the Fall River Line boat trains between Boston and Fall River. These trains reached a maximum of 15 cars. For this and other heavy service on the Old Colony, Mr. Lauder built 4-4-0 type locomotives weighing about 99,000 pounds, with 18x24-inch cylinders and driving wheels 69 inches in diameter. In 1887, these engines were carrying a pressure as high as 175 pounds, and were doing their work most successfully.

Another interesting development during the eighties was the introduction of the Belpaire boiler in American locomotive practice. The Norfolk and Western used Belpaire boilers on locomotives of the 4-4-0 type built in 1883, and various other roads were soon interested in this design. The Pennsylvania, which became the most extensive user of the Belpaire boiler, applied it to 4-4-0 type locomotives of Class O (D10) for soft coal, and class P (D12 and D13) for hard coal, in 1889.

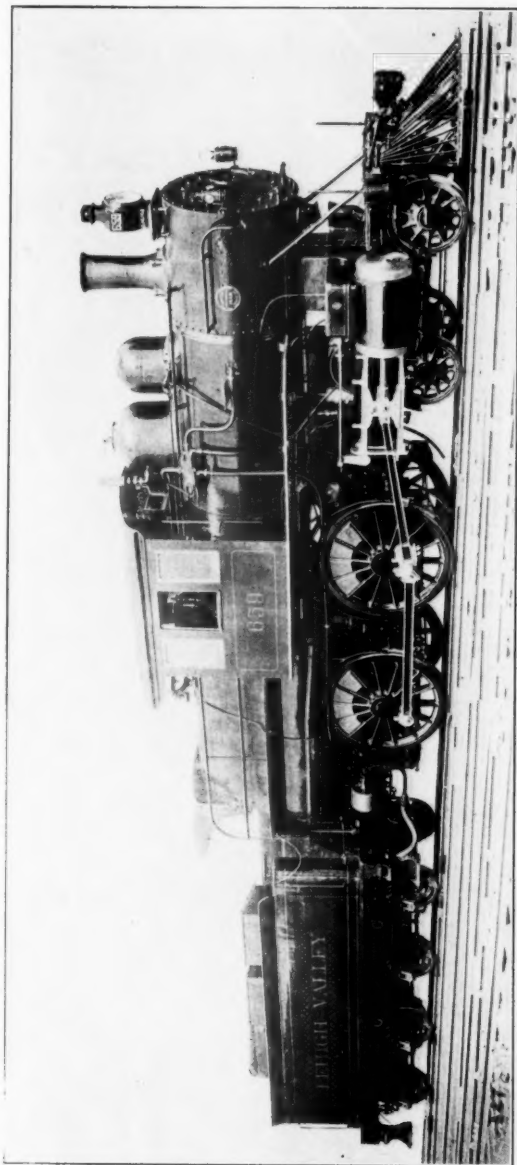
The early nineties witnessed a speeding-up of passenger schedules on a number of roads, and this called for locomotives of increased power and speed capacity. As a result the big wheel again came into vogue, and other dimensions were correspondingly increased.

In 1890 the Baltimore and Ohio placed locomotives of the 4-4-0 type, with 78-inch drivers, built by the Baldwin Locomotive Works, on the Philadelphia-Washington run; and in the same year the New York Central and Hudson River Railroad received, from the Schenectady Locomotive Works, the first locomotives of the so-called 870 Class, which were the largest of the 4-4-0 type in existence at the time of their construction. William Buchanan, Superintendent of Motive Power of the Railroad, and Albert J. Pitkin, General Manager of the Schenectady Locomotive Works, cooperated in the preparation of this design. The first of these locomotives had 70-inch drivers, but the diameter was subsequently increased to 78 inches. Late in 1891 the Baldwin Locomotive Works built, for the Central Railroad of New Jersey, the first of a group of large anthracite-burning locomotives of the 4-4-0 type, some of which had Vaucelain compound and some single-expansion cylinders. These locomotives, like the 870 Class on the New York Central, had driving wheels 78 inches in diameter and carried a steam pressure of 180 pounds.

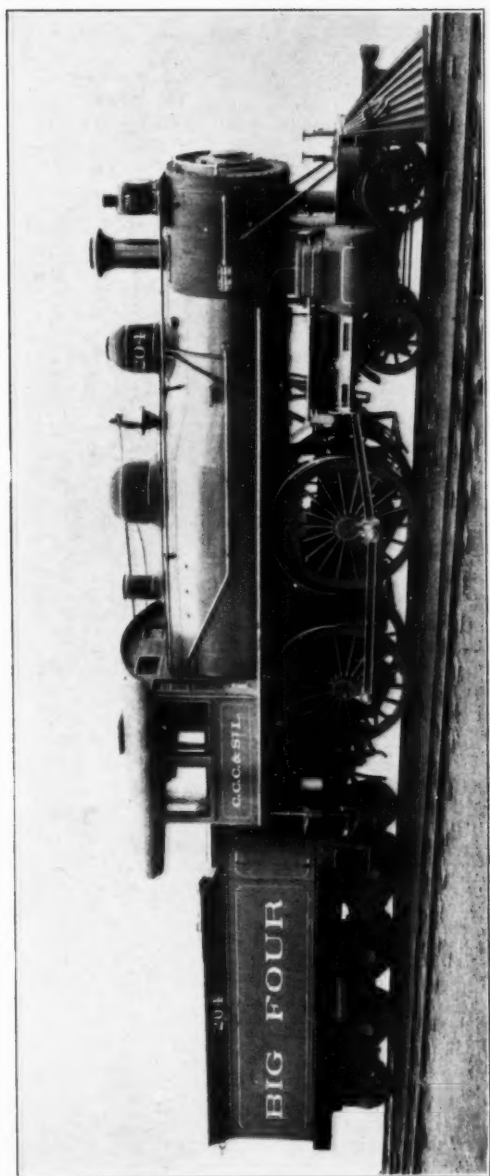
There are a few isolated cases of comparatively modern 4-4-0 type locomotives having driving wheels seven or more feet in diameter. Among them should be mentioned New York Central engine 999, with 86-inch wheels; and engine 1515 for the Pennsylvania Railroad, with 84-inch wheels. The latter was an experimental locomotive of the two-cylinder or cross-compound type, designed on the Lindner system of compounding. It was never duplicated. The Philadelphia and Reading also had in service for a time, two 4-4-0 type locomotives with drivers 84¼ inches in diameter, which were originally built with the 4-2-2 wheel arrangement. These were anthracite burners with Wootten fireboxes, the cab being placed over the middle of the boiler. As far as the writer is aware, all of the above-mentioned locomotives are now scrapped or, if any are still in existence, they have smaller drivers.

In the early nineties there were indications that the supremacy of the 4-4-0 type, in the high-speed field, was soon to be seriously contested. In 1892 the Baldwin Locomotive Works built, for the Philadelphia and Reading, a group of Vauclain compound locomotives of the 2-4-2 type, with Wootten boilers and driving wheels 78 inches in diameter. The driving wheel centers were only six feet ten inches apart, and the shallow firebox was placed back of them and over the trailers. This permitted the combination of large drivers and a very wide firebox, without raising the boiler center to an excessive height. The Reading locomotives were followed by another 2-4-2 type constructed by the same builders, which was exhibited by them at the Columbian Exposition held at Chicago in 1893. This locomotive, appropriately named *Columbia*, was a soft-coal burner with a firebox 42¾ inches wide, placed above the frames and back of the rear driving axle. The drivers were 84¼ inches in diameter, and Vauclain compound cylinders were applied. Advantage was not taken of the opportunity to use a "wide" firebox, and the boiler was actually smaller than that of the 870 Class on the New York Central, which had about the same weight on drivers. It was not until 1895 that the first soft-coal burner with a deep, wide firebox was built. This was engine 590, a 2-4-2 type constructed by the Baldwin Locomotive Works for the Chicago, Burlington and Quincy Railroad. It had driving wheels 84¼ inches in diameter, while the grate area was 44.4 square feet, the boiler proportions thus being very different from those of the *Columbia* and contemporary locomotives of the 4-4-0 type. The boiler of engine 590 was not an unqualified success, and it was subsequently rebuilt with a narrow firebox; neither was the 2-4-2 type perpetuated, as its tracking qualities did not prove satisfactory.

But another rival of the 4-4-0 type was now appearing. This was the 4-4-2 (Atlantic), first built by the Baldwin Locomotive Works for the Atlantic Coast Line and placed in service on that road early in 1895. The requirements of the Coast Line called for a fast passenger locomotive having the adhesion of a four-coupled design combined with the steaming capacity of a six-coupled, and the 4-4-2 type proved the solution. The locomotives might be described as Ten-wheelers in which the rear drivers were left uncoupled and were reduced in diameter. The firebox was placed above the frames and back of the rear driving pedestals, but its width was limited by the transverse distance between



Lehigh Valley R. R. #659. Baldwin, 1893. Modified Wootton Firebox for Burning Anthracite Coal. Courtesy of Baldwin Locomotive Works.



C. C. C. & St. L. #204. Schenckelady, 1838-1900. One of the last of this type. Courtesy of American Locomotive Company

the wheels and it could not therefore be described as "wide." Comparing the new locomotives with contemporary 4-4-0 type engines having long, narrow fireboxes, there was not much change in the basic proportions. Seven representative 4-4-0 type locomotives, developing tractive forces comparable to that of the Atlantic Coast Line engines, showed an average of 64.2 per cent of total weight on driving wheels, and 70.5 square feet of heating surface per square foot of grate area; while the corresponding figures for the 4-4-2 type were 56.3 and 78.0 respectively. The heating surface of the latter was increased through the use of longer tubes, but there was no increase in grate area because the narrow firebox was retained. The 4-4-0 type, however, was now definitely on the defensive, and no longer held the monopoly it once enjoyed.

Table III gives leading particulars of representative locomotives of the 4-4-0 type built during the period 1893-1897. All were successful examples of conventional design. In each case, balanced slide valves and Stephenson link motion were used. With the exception of the Lehigh Valley and the Lackawanna locomotives, all had long fireboxes placed above the rear driving axle and, in the majority of cases, over the frames. The Lehigh Valley and the Lackawanna locomotives had fireboxes of the modified Wootten type, without combustion chambers, which were placed above the rear drivers. The cab, in each case, was located over the middle of the boiler. Locomotives of generally similar design were in use on various other roads in the hard coal region of Pennsylvania.

The locomotive for the New York Central Railroad was a direct development of the 870 Class to which previous reference has been made. It had a larger boiler and was consequently somewhat heavier, but the two designs were closely similar.

In connection with the New York Central locomotives, attention should be called to the engine for the Lake Shore and Michigan Southern Railway, which was one of a group built in 1893 to haul the "Exposition Flyer," the 20-hour train between New York and Chicago. On the Lake Shore line, with its easy grades and comparatively light curvature, these locomotives proved quite as successful as the heavier locomotives of the 870 Class, used by the New York Central to haul the same trains east of Buffalo. The Lake Shore engines were among the last of the 4-4-0 specifically designed for high-speed passenger service, to have deep fireboxes placed between the frames and driving axles. The firebox was of the Belpaire type, as frequently used, at that time, by the Brooks Locomotive Works and other builders.

The Pennsylvania locomotives of the D16 group were introduced in 1895, and were built with two sizes of driving wheels—68 and 80 inches in diameter respectively. Otherwise the two classes were alike. These locomotives were very carefully designed, with light reciprocating parts; they were built in large numbers at the Altoona Works of the Railroad Company, and proved highly successful in handling fast passenger service on all the main line divisions of the System. The boilers were suitable for the use of either lump anthracite or bituminous coal, and had fireboxes of the Belpaire type, which had been standard on the road in new designs prepared since 1885.

During the five years subsequent to 1897, the 4-4-0 type made its last stand in competition with the 4-4-2 and other types of higher power designed for fast passenger service. Table IV gives particulars of representative heavy eight-wheelers of the period. The Pennsylvania continued to build locomotives of the D16 group until 1902, hence the latest development (Class D16d) is included. With the exception of the Chicago and Alton locomotive and the superheated hard-coal burner for the Philadelphia and Reading (built as late as 1914), both of which had piston valves, all the locomotives listed were fitted with balanced slide valves. Maximum capacity was sought without exceeding the weight limitations specified by the various railroads; but in the majority of cases this capacity could be obtained only by forcing the rate of fuel consumption per square foot of grate to excessively high figures. The designs were, however, very notable as representing a determined effort to retain the 4-4-0 type, and adapt it to heavier train loads and faster schedules.

The table includes two designs of locomotives built in 1899 for the Chicago and North Western Railway. The class with 75-inch wheels was intended for heavy express passenger service, and that with 80-inch wheels for mail trains which were lighter in weight but operated on faster schedules. The former locomotives, as far as the writer is aware, had the largest heating surface ever provided in an engine of the 4-4-0 type. But they were outclassed very shortly after being built; for in 1900 the road received, from the Schenectady Locomotive Works, a group of 4-4-2 (Atlantic) type locomotives which soon displaced the big eight-wheelers in the most difficult passenger service. The Atlantics were of the following dimensions:—

| | |
|-------------------------------------|-----------|
| Cylinders | 20" x 26" |
| Driving Wheels, diam. | 80" |
| Steam Pressure, lb. | 200 |
| Grate Area, sq. ft. | 46.2 |
| Total Heating Surface, sq. ft. | 3016 |
| Weight on Driving Wheels, lb. | 90,000 |
| Weight, total Engine, lb. | 160,000 |
| Rated Tractive Force, lb. | 22,100 |

As far as weight on drivers and rated tractive force were concerned, the new locomotives differed but little from their predecessors; but many of the other proportions differed greatly in the two designs, as the following table shows:—

| | 4-4-0 type | 4-4-2 type |
|--|------------|------------|
| Percent total weight on drivers | 63. 6 | 56. 2 |
| Ratio—Heating surface to grate area | 83. 0 | 65. 2 |
| Ratio—Grate area (sq. ft.) to cylinder volume (cu. ft.) | 3.36 | 4.36 |
| Ratio—Heating surface (sq. ft.) to cyl. volume (cu. ft.) | 288.00 | 319.00 |
| Pounds weight on drivers per sq. ft. of heating surface | 34.70 | 29.90 |
| Pounds weight on drivers per. sq. ft. of grate area | 2870. 0 | 1948. 0 |

The Atlantic type locomotives proved their ability to develop as high as 1500 horsepower, and under similar operating conditions showed a fuel saving of approximately 20 per cent as compared to the heavy eight-wheelers. This sealed the doom of the 4-4-0 type on the Chicago and North Western, as far as new construction was concerned. Various

other lines, at this time, had locomotives of the 4-4-2 type either in service or on order. With heavier track construction, permitting higher wheel loads, the bulk of the high-speed traffic could still be handled with four-coupled locomotives; but increased train loads and speeds demanded higher boiler power than could be obtained with the 4-4-0 wheel arrangement, and here the 4-4-2 type met requirements.

The most notable 4-4-0 type locomotives built since the opening of the present century have been hard-coal burners fitted with fireboxes of the Wootten or modified Wootten types. Particulars of some of these locomotives are given in Table IV. The locomotives for the Delaware, Lackawanna and Western were used in heavy, fast main-line service, and proved their ability to develop indicated horsepowers up to 1300. The Lackawanna is one of the few important roads in the United States that never used locomotives of the Atlantic type. The locomotives for the Philadelphia and Reading and the Central Railroad of New Jersey were specially designed for fast local work, and for express service in which the high horsepower capacity of the Atlantic type was not required.

A few 4-4-0 type locomotives suitable for burning bituminous coal, and having wide fireboxes placed above the rear drivers, were built by the Baldwin Locomotive Works about 30 years ago. Such a locomotive, constructed for the Wheeling and Lake Erie Railroad, is listed in Table IV. While this arrangement provided ample grate area, the firebox depth and volume were restricted and the design was not perpetuated.

The few remaining 4-4-0 type locomotives built during the past 25 to 30 years have been designed for secondary service or for work on comparatively short roads. The more recent of these designs include superheaters, and some of the former main-line locomotives have been rebuilt to use superheated steam; but for first class main line service the type is now extinct. No type of locomotive, however, has had a more noteworthy career than the 4-4-0; nor has any type proved better fitted for the work required of it.

It is to be regretted that very few, if any, of the notable eight-wheelers built during the past century have been preserved in their original condition. Due in part to a lack of appreciation of their value, many fine lithographs and illustrations of these old engines have also been destroyed. It is hoped, therefore, that this brief record may help to maintain interest in a type of locomotive which, for many years, was the main-stay of the American railroad, and a factor of first importance in the development of this country.

* * * * *

Table V has been prepared to indicate the growth of the 4-4-0 type during the period 1840-1900. It is difficult to obtain full particulars regarding the earlier designs, but the figures given are believed to represent reasonable averages for the different dates. They do not, however, apply to any particular locomotives.

BIBLIOGRAPHY

Special reference was made to the following in the preparation of this article:—

Development of the Locomotive Engine, by Angus Sinclair.

The Early Motive Power of the Baltimore and Ohio Railroad, by J. Snowden Bell.

The Locomotive and Philadelphia's Share in its Early Improvement, by Joseph Harrison, Jr.

Locomotive Engineering, by Zerah Colburn.

Norris's Handbook for Locomotive Engineers and Machinists, by Septimus Norris.

History, various publications and records of The Baldwin Locomotive Works.

Catalogs of the American Locomotive Company (including those issued in 1897 and 1899 by the Schenectady Locomotive Works and the Brooks Locomotive Works).

Various periodicals, especially the *American Railroad Journal*, the *Railroad Gazette* and the *Journal of the Franklin Institute*.

(EDITOR'S NOTE: Mr. Warner in this article has referred to the 870 class of engine on the New York Central & Hudson River R. R. This locomotive was one of a group of locomotives furnished the road during the last decade of the last century. All of these locomotives were classed "I". True, some had 70" drivers, others had 78" drivers and some larger, but they were all assigned the same classification letter. This did not apply to the #999 as she was classified "N". Mr. Warner has simply referred to this class of locomotives in its broadest sense and it is hoped that our readers will construe it accordingly.)

TABLE I

Representative Heavy 4-4-0 Type Locomotives Built During the Period of the Seventies.

| ROAD | Builder | Cylinders | Drivers, diam. | Steam Pressure, lb. | Grate Area, sq. ft. | Heating Surface, sq. ft. | Weight on Drivers, lb. | Weight, total lb. | Tractive Force, lb. |
|---|--------------|-----------|-------------------|---------------------------|---------------------------|--------------------------------|------------------------------|-------------------------|---------------------------|
| Chicago, Milwaukee & St. Paul Minneapolis & St. Louis Grand Trunk New York Central & Hudson River Missouri, Kansas & Texas Chicago, Burlington & Quincy Philadelphia, Wilmington & Baltimore Pennsylvania—Class C (D3) | Danforth | 15"x24" | 67½" | 130 | 13.5 | 861 | 38,350 | 60,200 | 8,850 |
| | Grant | 16"x24" | 61" | 130 | 14.0 | 903 | 42,000 | 62,000 | 11,150 |
| | Mason | 17"x24" | 66" | 125 | 16.4 | 1011 | 40,000 | 62,000 | 11,200 |
| | Hinkley | 16"x24" | 68" | 130 | 15.0 | 855 | 41,000 | 63,000 | 10,000 |
| | Baldwin | 16"x24" | 60¾" | 130 | 15.5 | 926 | 42,000 | 65,000 | 11,200 |
| | Baldwin | 16"x24" | 62" | 130 | 15.5 | 950 | 42,000 | 65,000 | 11,000 |
| | Baldwin | 16"x24" | 61" | 125 | 15.5 | 923 | 43,000 | 66,000 | 11,150 |
| | Baldwin | 17"x24" | 61" | 125 | 16.5 | 1070 | 45,000 | 70,000 | 12,100 |
| | Railroad Co. | 17"x24" | 68½" | 130 | 17.7 | 1059 | 44,850 | 70,500 | 11,200 |
| | Baldwin | 17"x24" | 61" | 130 | 15.7 | 1078 | 46,000 | 71,000 | 12,600 |
| Delaware & Hudson Central R. R. of New Jersey Delaware, Lackawanna & Western Central R. R. of New Jersey Pennsylvania—Class C anthracite (D4) Philadelphia & Reading | Baldwin | 17"x24" | 61¼" | 130 | 24.0 | 1067 | 50,000 | 75,000 | 12,500 |
| | Baldwin | 17"x22" | 62" | 130 | 24.0 | 1065 | 51,500 | 75,000 | 11,300 |
| | Baldwin | 18"x24" | 67¾" | 130 | 25.6 | 1122 | 52,000 | 78,000 | 12,700 |
| | Baldwin | 18"x22" | 67" | 130 | 25.7 | 1120 | 55,000 | 80,000 | 11,800 |
| Pennsylvania—Class C anthracite (D4) Philadelphia & Reading | Railroad Co. | 17"x24" | 62" | 125 | 28.7 | 1158 | 56,200 | 81,800 | 11,890 |
| | Railroad Co. | 17"x22" | 68" | 120 | 25.2 | 1014 | 45,500 | 75,000 | 9,950 |

Hard Coal Burners

| | | | | | | | | | |
|--------------------------------------|--------------|---------|------|-----|------|------|--------|--------|--------|
| Delaware & Hudson | Baldwin | 17"x24" | 61¼" | 130 | 24.0 | 1067 | 50,000 | 75,000 | 12,500 |
| Central R. R. of New Jersey | Baldwin | 17"x22" | 62" | 130 | 24.0 | 1065 | 51,500 | 75,000 | 11,300 |
| Delaware, Lackawanna & Western | Baldwin | 18"x24" | 67¾" | 130 | 25.6 | 1122 | 52,000 | 78,000 | 12,700 |
| Central R. R. of New Jersey | Baldwin | 18"x22" | 67" | 130 | 25.7 | 1120 | 55,000 | 80,000 | 11,800 |
| Pennsylvania—Class C anthracite (D4) | Railroad Co. | 17"x24" | 62" | 125 | 28.7 | 1158 | 56,200 | 81,800 | 11,890 |
| Philadelphia & Reading | Railroad Co. | 17"x22" | 68" | 120 | 25.2 | 1014 | 45,500 | 75,000 | 9,950 |

The first five locomotives presented in this table were described and illustrated in the original edition of Forney's *Catechism of the Locomotive*, but the roads for which they were built were not stated. They are, however, excellent representatives of the 4-4-0 type as built during the early seventies.

Steam pressures changed but little during this period, as did also the weights of locomotives having the same size cylinders. This was in part due to the fact that, subsequent to the financial panic of 1873, railroad construction and locomotive building were at a low ebb until the close of the decade.

Specifications of a number of the locomotives included in this table, do not give steam pressures or weights. These have been estimated, in such cases, from builders catalogs and other sources of information, and are believed to be fairly accurate.

TABLE II
Representative Heavy 4-4-0 Type Locomotives Built During the Years 1880-1891.

| Date | Road | Builder | Cylinders | Drivers, diam. | Steam Pressure, lb. | Grate Area, sq. ft. | Heating Surface, sq. ft. | Weight on Drivers, lb. | Weight, total Engine, lb. | Tractive Force, lb. |
|--------------------------|------------------------------------|--------------|-----------|----------------|---------------------|---------------------|--------------------------|------------------------|---------------------------|---------------------|
| 1881 | Pennsylvania—Class BA (D2a) | Railroad Co. | 18"x24" | 68" | 125 | 17.6 | 1083 | 53,750 | 82,200 | 12,150 |
| 1883 | Northern Pacific | Baldwin | 17"x24" | 62" | 130 | 16.0 | 1335 | 54,350 | 83,800 | 12,400 |
| 1883 | Norfolk & Western | Baldwin | 18"x24" | 68" | 130 | 17.8 | 1175 | 55,000 | 80,000 | 12,700 |
| 1884 | Central Pacific | Railroad Co. | 17½"x26" | 69" | 150 | 18.7 | 1355 | 55,040 | 85,800 | 14,300 |
| 1886 | Atlantic Coast Line | Baldwin | 18"x24" | 63" | 130 | 17.0 | 1458 | 54,500 | 90,400 | 13,700 |
| 1886 | Louisville & Nashville | Rogers | 18"x24" | 64" | 155 | 18.0 | 1334 | 63,600 | 101,000 | 16,000 |
| 1887 | Great Northern | Rogers | 18"x24" | 63" | 140 | 18.7 | 1187 | 60,300 | 94,100 | 14,690 |
| 1887 | Baltimore & Ohio | Railroad Co. | 18"x24" | 69" | 145 | 17.5 | 1270 | 67,000 | 101,000 | 13,890 |
| 1888 | Union Pacific | Brooks | 18"x26" | 62" | 150 | 17.2 | 1449 | 63,000 | 100,000 | 17,300 |
| 1888 | New York, New Haven & Hartford | Baldwin | 20"x22" | 68½" | 160 | 18.6 | 1802 | 68,000 | 110,000 | 17,500 |
| 1889 | Nashville, Chattanooga & St. Louis | Rogers | 18"x24" | 66" | 150 | 17.8 | 1447 | 67,000 | 107,000 | 15,000 |
| 1889 | Baltimore & Ohio | Baldwin | 19"x24" | 66" | 140 | 25.2 | 1689 | 72,460 | 105,600 | 15,600 |
| 1890 | Missouri, Kansas & Texas | Baldwin | 18"x24" | 63" | 150 | 17.0 | 1575 | 64,600 | 102,500 | 15,800 |
| 1890 | Baltimore & Ohio | Baldwin | 20"x24" | 78" | 140 | 25.2 | 1687 | 75,000 | 116,000 | 14,700 |
| 1891 | New York Central & Hudson River | Schenectady | 19"x24" | 78" | 180 | 27.3 | 1837 | 80,400 | 123,500 | 17,100 |
| Hard Coal Burners | | | | | | | | | | |
| 1880 | Philadelphia & Reading | Railroad Co. | 21"x22" | 68" | 140 | 76.0* | 1117 | 64,250 | 96,200 | 17,000 |
| 1881 | Pennsylvania—Class K (D6) | Railroad Co. | 18"x24" | 78" | 140 | 34.7 | 1230 | 64,900 | 96,700 | 11,860 |
| 1881 | Central R. R. of New Jersey | Baldwin | 19"x24" | 68" | 130 | 38.2 | 1340 | 66,850 | 93,000 | 14,100 |
| 1882 | Lehigh Valley | Baldwin | 19"x24" | 62" | 130 | 38.0 | 1340 | 66,000 | 93,000 | 15,500 |
| 1883 | Pennsylvania—Class P (D11a) | Railroad Co. | 18½"x24" | 68" | 140 | 34.7 | 1530 | 67,800 | 100,600 | 14,370 |
| 1889 | Philadelphia & Reading | Baldwin | 21"x22" | 68½" | 160 | 76.0* | 1325 | 69,500 | 105,500 | 19,300 |

*Wootten firebox, with wide grate over rear driving wheels.

This table is arranged chronologically in order to indicate the increase in steam pressure which occurred during the period, and also the "sag" in driving wheel diameters between the Pennsylvania's Class K locomotives, built 1881-1883, and the Baltimore & Ohio and New York Central Locomotives, built in 1890 and 1891 respectively.

TABLE III

Representative Heavy 4-4-0 Type Locomotives Built During the Years 1892-1897.

| Road | Builder | Cylinders | Drivers, diam. | Steam Pressure, lb. | Grate Area, sq. ft. | Heating Surface, sq. ft. | Weight on Drivers, lb. | Weight, total Engine, lb. | Tractive Force, lb. |
|--|-------------|-----------|-------------------|---------------------------|---------------------------|--------------------------------|------------------------------|---------------------------------|---------------------------|
| Chicago, Burlington & Quincy | Rogers | 18"x24" | 69" | 165 | 24.5 | 1418 | 65,500 | 102,000 | 15,820 |
| Lake Shore & Michigan Southern | Brooks | 17"x24" | 72" | 180 | 18.4 | 1398 | 65,100 | 104,600 | 14,730 |
| Baltimore & Ohio | Baldwin | 20"x24" | 78" | 165 | 24.7 | 1693 | 75,210 | 116,360 | 17,300 |
| Concord & Montreal | Schenectady | 19"x24" | 70" | 190 | 25.3 | 1933 | 75,000 | 116,400 | 19,990 |
| Boston & Albany | Schenectady | 19"x24" | 69" | 190 | 26.9 | 2067 | 74,500 | 119,000 | 20,280 |
| Illinois Central | Brooks | 18"x26" | 75" | 200 | 27.2 | 1802 | 80,000 | 120,000 | 19,100 |
| Southern Pacific | Schenectady | 19"x24" | 69" | 180 | 25.3 | 1872 | 75,400 | 120,400 | 19,210 |
| Chicago, Indianapolis & Louisville | Brooks | 18½"x24" | 72" | 190 | 26.8 | 1950 | 79,000 | 121,800 | 18,470 |
| Fitchburg | Schenectady | 19"x24" | 73" | 190 | 26.9 | 2067 | 78,000 | 124,400 | 21,240 |
| Chicago & North Western | Schenectady | 19"x24" | 75" | 190 | 26.9 | 1875 | 78,000 | 125,600 | 18,660 |
| Cleveland, Cincinnati, Chicago & St. Louis | Schenectady | 20"x24" | 72" | 190 | 30.8 | 2168 | 83,600 | 127,000 | 21,530 |
| Vandalia | Schenectady | 20"x24" | 73" | 190 | 30.0 | 2168 | 84,500 | 129,200 | 21,240 |
| New York, New Haven & Hartford | Schenectady | 20"x24" | 73" | 190 | 30.2 | 2114 | 86,000 | 131,000 | 21,240 |
| New York Central & Hudson River | Schenectady | 19"x24" | 78" | 190 | 30.7 | 1968 | 90,000 | 136,000 | 17,940 |

Hard Coal Burners

| | | | | | | | | | |
|--------------------------------|--------------|----------|------|-----|------|------|--------|---------|--------|
| Central R. R. of New Jersey | Baldwin | 20"x24" | 78" | 180 | 38.5 | 1696 | 87,300 | 124,900 | 18,800 |
| Delaware & Hudson | Schenectady | 19"x24" | 68½" | 180 | 37.2 | 1859 | 87,000 | 126,700 | 19,400 |
| Pennsylvania (Class D14a) | Railroad Co. | 19"x24" | 80" | 175 | 33.2 | 1983 | 87,300 | 127,050 | 16,110 |
| Pennsylvania (Class D16a) | Railroad Co. | 18½"x26" | 80" | 185 | 33.2 | 1905 | 93,100 | 134,500 | 17,500 |
| Lehigh Valley | Baldwin | 20"x24" | 69" | 160 | 67.7 | 1890 | 96,640 | 138,100 | 18,920 |
| Delaware, Lackawanna & Western | Dickson | 19½"x24" | 68" | 160 | 80.0 | 1720 | 79,500 | 117,000 | 18,300 |

The Central R. R. of New Jersey also had four-cylinder Vaucain compound locomotives, similar to the engine listed above, but with cylinders measuring 13" and 22"x24".

The Pennsylvania locomotives, although suitable for hard coal, were also used in soft coal territory. The D16 group included a design with 68" drivers, developing a tractive force of 20,580 pounds.

The Lehigh Valley locomotive had a wide firebox placed over the rear drivers. The Lackawanna locomotive was of similar design, but with a somewhat wider firebox fitted for burning buckwheat anthracite.

TABLE IV
Representative Heavy 4-4-0 Type Locomotives Built Subsequent to 1897.

| Road | Builder | Cylinders | Drivers, diam. | Steam Pressure, lb. | Grate Area, sq. ft. | Heating Surface, sq. ft. | Weight on Drivers, lb. | Weight, total Engine, lb. | Tractive Force, lb. |
|--|--------------------|---------------|-------------------|---------------------------|---------------------------|--------------------------------|------------------------------|---------------------------------|---------------------------|
| Cleveland, Cincinnati, Chicago & St. Louis | American Loco. Co. | 20" x 26" | 78" | 190 | 30.7 | 2161 | 86,000 | 130,500 | 21,530 |
| Pittsburgh & Western | American Loco. Co. | 20" x 26" | 70" | 180 | 25.2 | 2261 | 89,000 | 133,000 | 22,730 |
| Chicago & North Western | American Loco. Co. | 19" x 26" | 80" | 190 | 30.3 | 2354 | 87,000 | 136,000 | 18,950 |
| Boston & Albany | American Loco. Co. | 20" x 26" | 75" | 190 | 30.3 | 2505 | 88,500 | 136,500 | 22,300 |
| Chicago & North Western | American Loco. Co. | 19 1/2" x 26" | 75" | 190 | 30.3 | 2508 | 87,000 | 137,000 | 21,300 |
| Pennsylvania (Class D16d) | Railroad Co. | 18 1/2" x 26" | 80" | 185 | 33.2 | 1900 | 96,000 | 138,000 | 17,500 |
| Chicago & Alton | American Loco. Co. | 19" x 26" | 73" | 210 | 31.8 | 2177 | 90,500 | 139,000 | 23,000 |
| New York, New Haven & Hartford | American Loco. Co. | 20" x 26" | 78" | 200 | 30.2 | 2109 | 92,000 | 139,000 | 22,700 |
| Wheeling & Lake Erie | Baldwin Loco. Wks. | 19" x 26" | 72" | 200 | 44.0 | 2203 | 93,300 | 139,700 | 22,200 |
| Chesapeake & Ohio | American Loco. Co. | 20" x 26" | 72" | 200 | 31.3 | 2483 | 90,000 | 140,000 | 24,000 |
| Minneapolis & St. Louis | American Loco. Co. | 19 1/2" x 26" | 70" | 200 | 30.0 | 2036 | 98,500 | 144,500 | 24,000 |
| St. Louis-South Western | Baldwin Loco. Wks. | 19" x 26" | 69" | 200 | 28.9 | 1856 | 92,100 | 145,400 | 23,100 |
| New York Central | Railroad Co. | 19" x 24" | 77" | 200 | 30.7 | 2404 | 94,000 | 146,400 | 19,150 |
| Pittsburgh & Lake Erie | American Loco. Co. | 19" x 26" | 72" | 200 | 30.0 | 2306 | 102,000 | 151,000 | 22,200 |
| HARD COAL BURNERS WITH WIDE FIREBOXES | | | | | | | | | |
| Delaware, Lackawanna & Western | American Loco. Co. | 20" x 26" | 69" | 185 | 87.6 | 2143 | 93,000 | 139,000 | 23,700 |
| Philadelphia & Reading | Baldwin Loco. Wks. | 21" x 22" | 68 1/2" | 200 | 76.0 | 1959 | 98,900 | 145,000 | 24,100 |
| Delaware & Hudson | American Loco. Co. | 20" x 24" | 69" | 190 | 79.8 | 2261 | 94,000 | 146,000 | 22,500 |
| Central R. R. of New Jersey | American Loco. Co. | 19" x 26" | 69" | 200 | 81.6 | 2006 | 108,000 | 158,000 | 23,120 |
| Philadelphia & Reading | Baldwin Loco. Wks. | 21" x 24" | 68 1/2" | 210 | 86.0 | 1517* | 120,500 | 173,500 | 27,600 |

*Water heating surface only. Superheating surface, 257 sq. ft.

TABLE V
Development of the 4-4-0 Type, 1840-1900.

| No. | Date | Cylinders | Drivers, diam. | Steam Pressure, lb. | Grate Area, sq. ft. | Heating Surface, sq. ft. | Weight on Drivers, lb. |
|-----|------|-----------|-------------------|---------------------------|---------------------------|--------------------------------|------------------------------|
| 1 | 1840 | 13"x18" | 54" | 90 | 7.5 | 500 | 20,000 |
| 2 | 1850 | 15"x20" | 60" | 100 | 11.0 | 700 | 30,000 |
| 3 | 1860 | 16"x22" | 60" | 115 | 14.0 | 850 | 40,000 |
| 4 | 1870 | 17"x24" | 63" | 125 | 16.5 | 1050 | 45,000 |
| 5 | 1880 | 18"x24" | 66" | 130 | 17.5 | 1200 | 53,000 |
| 6 | 1890 | 19"x24" | 69" | 160 | 25.0 | 1600 | 72,000 |
| 7 | 1900 | 19"x26" | 75" | 200 | 30.0 | 2100 | 90,000 |

* * * * *

| No. | Wt., Total Engine, lb. | Tractive Force, lb. | Cylinder Volume, cu. ft. | Ratio..... | | | |
|-----|------------------------------|---------------------------|--------------------------------|-------------------------------|----------------------------------|-----------------------------------|----------------------|
| | | | | Grate Area to Cyl. Vol. | Heating Surf. to Cyl. Vol. | Heating Surf. to Grate Area | Ratio of Adhesion |
| 1 | 30,000 | 4,320 | 2.78 | 2.70 | 180 | 66.8 | 4.64 |
| 2 | 48,000 | 6,400 | 4.08 | 2.70 | 172 | 63.6 | 4.69 |
| 3 | 62,000 | 9,200 | 5.10 | 2.75 | 167 | 60.7 | 4.35 |
| 4 | 70,000 | 11,700 | 6.34 | 2.60 | 166 | 63.7 | 3.85 |
| 5 | 82,000 | 13,000 | 7.06 | 2.48 | 170 | 68.5 | 4.08 |
| 6 | 108,000 | 17,100 | 7.88 | 3.18 | 203 | 64.0 | 4.21 |
| 7 | 135,000 | 21,300 | 8.52 | 3.52 | 246 | 70.0 | 4.22 |

The weights, dimensions and ratios given in this table are reasonable averages for the various periods, but do not apply to any particular locomotives.

Nos. 1 and 2 burned wood for fuel; No. 3, wood or bituminous coal, and Nos. 4 to 7, bituminous coal. Nos. 1 to 5 had deep fireboxes between frames and driving axles; No. 6 had a long firebox above the rear axle and between the frames, and No. 7 a similar firebox over the frames.

The Pennoyer Colored Prints

We are again calling the attention of our members to this set of four colored prints which are reproductions made from the brush of that skillful and talented artist—A. Sheldon Pennoyer. This set of prints includes "Snowbound," a Crampton type of engine used in 1850 on the Camden & Amboy R. R.; the "Pioneer," built by Seth Wilmarth for the Cumberland Valley R. R. in 1851; "An American Express Train," drawn by a Rogers built locomotive of the seventies and, through the kindness of the Delaware & Hudson R. R., we are able to include the "Stourbridge Lion," imported by that road from England in 1829. The size of the "Pioneer" is 7x11, the other three are 8¼x10½. There are still a few sets remaining. The price is \$5.00 per set. Orders should be addressed to Chas. E. Fisher, 6 Orkney Road, Brookline, Mass.

Early Railroad Items

Arranged by CHAS. E. FISHER

BEFORE the era of the sensitive plate and photograph, reproductions of railroad items were made either by a wood cut or a lithograph. The former was cut in wood, the latter in stone. The accuracy of the print depended upon the skill and the ability of the workman to truthfully portray the picture or object. The best known and the most accurate of the early print makers were Currier & Ives. These prints originally selling for 10c each have now reached an almost unbelievable value. Lithographs were used by the early locomotive builders as a form of advertising their product. Lithographs were not only in black and white but they were also printed in colors and many of them are unquestionably beautiful. The Currier & Ives prints were generally colored.

Probably no firm in America—Kennedy & Co., 785 Fifth Ave., New York City, is better informed in the matter of Americana. Through the persuasive powers of our member—Mr. A. Sheldon Pennoyer and through the kindness of Mr. Herman Wunderlich, Senior partner of Kennedy & Co., we are able to use their list as a basis for this compilation. Kennedy & Co. is not only the most outstanding print concern in this country but they have probably handled more prints dealing with American life than any known concern. Thus, their list, which they have so kindly furnished this Society and which we have permission to use represents years of search and years of knowledge on this subject and its authority and value cannot be questioned.

In presenting this list, the writer has taken the liberty of departing from the Kennedy & Co. list only in the matter of arrangement—of grouping the locomotives according to their builder. Where known material exists, either in the Baker Library, the University of Michigan or in the collections of the private collector, these additions have been made to the Kennedy & Co. list. Such information as to the name of the road, etc. has also been added from known records. Where information was not sufficiently clear in the Kennedy & Co. list as to whether the item is a duplicate of an already known and described item, both items have been included, even at the risk of duplication. In other words, the list which Mr. Wunderlich has so kindly allowed us to reproduce forms the basis of this compilation. It is not impossible that items exist which are not listed here and if our members can furnish this information, we will gladly record it in our future bulletins.

LOCOMOTIVE LITHOGRAPHS

AMOSKEAG MANUFACTURING COMPANY—MANCHESTER, NEW HAMPSHIRE

Locomotive (44-0) "Gen. Stark"—Chas. F. Thomas, Taunton, Mass., Del. Tappan & Bradford's Litho., Boston, Mass. 26½x39½. (This was the first locomotive built at this plant and was delivered, June, 1849 to the Concord R. R.) L. C.

Locomotive (44-0) Engine and tender—1851. Shop No. 11. (This engine was the "Ontario" and delivered to the Vermont Central Ry.)

- ✓ Locomotive (4-4-0) and tender, 1851. Shop No. 34. J. Swyne, Del. J. H. Bufford's Litho. 18x31". (This locomotive was the "Auburn" and delivered to the Rochester & Syracuse R. R., Nov. 3rd, 1851.) L. C.
- ✓ Locomotive (4-4-0) "Amoskeag". Shop No. 92, 1853. E. P. Abbott, Del. J. H. Bufford's Litho. 18x28". (This locomotive delivered to the Boston & Maine R. R., Apr. 4th, 1853, under the name—"O. W. Bailey".) L. C.
- ✓ Locomotive (4-4-0) and tender. C. W. Pickeragill, Del., J. H. Bufford's Litho. Shop, No. 130. (This locomotive was the "Gazelle," delivered to the Great Western Ry. (Canada) Dec. 31, 1853.)
- ✓ Locomotive (4-4-0) "J. B. Jervis," Shop No. 150. C. W. Pickeragill, Del. J. H. Bufford's Litho. 15½x27½". (This locomotive delivered to the Northern Indiana R. R.) L. T.
- ✓ Locomotive (4-4-0) "Saturn," Shop No. 200, 1854. C. W. Pickeragill, Del. J. H. Bufford's Litho. 21x33½" (Road Unknown). L. C.
- ✓ Outside Connected Passenger Engine, J. H. Bufford's Litho. 20½x30¾". L. C.

M. W. BALDWIN—PHILADELPHIA, PENNSYLVANIA

- Baldwin's Patent Freight Engine, 1838-40. Engraving. 11¼x6¾".
- Baldwin's Patent Passenger Engine, 1838-40. Engraving. 11x6¾".
- Baldwin & Vail's Engine for Burden. Yeager, Engr. 1841. 6¼x9".
- ✓ Locomotive (0-8-0) Type G—freight, no cab. Drawn by Hobart Brown, L. N. Rosenthal, Litho. 23x36". L. C.
- ✓ Locomotive (0-8-0) "Iron City", and part of tender. Jonathan Ord, Del. L. N. Rosenthal, Litho. 21x35". (This locomotive was delivered to the Pennsylvania R. R., 1854.) L. C.
- ✓ Locomotive (4-4-0) "Tiger", and tender. Jonathan Ord, Del., L. N. Rosenthal, Litho. 22x37". (This locomotive was delivered to the Pennsylvania R. R., 1856.) L. C.
- ✓ Locomotive (4-4-0) "President" and tender. Jonathan Ord, Del. L. N. Rosenthal, Litho. 20x37½". (This locomotive was delivered to the Cleveland & Pittsburgh R. R., 1856.) L. C.
- ✓ Locomotive (4-4-0)—Type C. Drawn by David S. Vaughn. L. N. Rosenthal, Litho. 20x36". L.
- Three locomotives, two Baldwin, with Baldwin plant in background. Wm. Mason, Del. J. Sartin, Scr. 5x14½". Mezzotint.
- Locomotives 4-4-0; 4-6-0 and 0-8-0. Drawn by Wm. P. Hennzey. Litho. of J. Bien. 21x33½".
- Baldwin's Engine—Baldwin Loco. Works. 17½x35½". L.
- Baldwin & Company's Locomotives. Litho. of J. Bien. 33½x19¼". L.
- Baldwin's Plan of Locomotives. Litho. of L. N. Rosenthal, 10¾x11½". L.
- Baldwin's Coal Burning Boiler. Litho. of J. Bien. 8x12¾". L. C.
- Baldwin's Freight Locomotive—Type D. Litho. of L. N. Rosenthal. 36x22". L.
- Baldwin Engines—Types C, D and E. Builder's Nos. 830, 840 and 850. Litho. of J. Bien. 7¾x12¾". (The Baldwin records indicate their #830, type C, 4-4-0 was the "Vulcan", delivered to the New Orleans, Jackson & Great Northern R. R. on Nov. 11, 1858; No. 840, type E, 0-8-0 was sold to the Havana R. R. #34, Feb. 18, 1859 and No. 850, type D, 4-6-0, was the "W. C. Gatewood", sold to the South Carolina R. R. on April 27, 1859.) L.
- Baldwin Locomotive Works, Union Pacific R. R. #80. M. Baird & Co. 17½x21". L.

BALTIMORE & OHIO R. R.

- ✓ Locomotive (4-6-0) #198. Drawn by W. Baker. Litho. of L. N. Rosenthal. 22x32½". (B. & O. #198 was built by the Baltimore & Ohio R. R. in 1854.)

BOSTON LOCOMOTIVE WORKS—BOSTON, MASSACHUSETTS

- ✓ Locomotive (4-4-0)—Shop No. 360, 1852. James F. Hinkley, Del. Litho. of J. H. Bufford & Co. (Shop No. 360 was the "Buffalo", delivered to the Buffalo & New York City R. R.) 20x26". L.

Liberty Engine and Tender Boston Machine Shop
 Designed and drawn by Charles Carr, Boston.
 Deated 1865. Offered for sale by Laurin's Old
 Print Shop at \$95.00 1-8-'50

Locomotive (4-4-0)—Shop No. 375, 1852. James F. Hinkley, Del. Litho of J. H. Bufford & Co. (Shop No. 375 was the "Norwalk", delivered to the Toledo, Norwalk & Cleveland R. R.) 20x36". L. T.

Locomotive (0-4-0)—Shop No. 490. Litho. of J. H. Bufford & Co. (Shop No. 490 was the "Lisle", delivered to the Syracuse & Binghamton R. R., Dec. 2, 1853.) 22x33". L.

Locomotive (4-4-0) and tender, Shop No. 554. View of Boston on the tender 1854. H. C. Wright, Del. Litho of J. H. Bufford. (Shop No. 554 was the "Sacramento", built for the Sacramento Valley R. R.) 20½x36". L.

Locomotive (4-4-0) and tender, "Rapid". Shop No. 603. 1856. Ransom G. Wright, Del. Litho of J. H. Bufford. (Shop No. 603 was delivered to the Chicago, St. Paul & Fond du Lac R. R. on Aug. 25, 1856 under the name—"Marquette".) 18½x27". L. C. Also, 16x26". L. T.

Locomotive (4-4-0)—"Boston". Shop No. 666. R. C. Wright, Del. Litho of J. H. Bufford. 1858. (Road unknown) 21½x34". L. C.

Locomotive (4-4-0) and tender—"Fashion". Shop No. 690. 1858. R. C. Wright, Del. Litho of J. H. Bufford & Co. (Road unknown).

Locomotive "Ysabel"—1858. Shop No. 960. Litho of J. H. Bufford & Co. (Road unknown. There is something obviously wrong in the above shop number as in 1858, the Boston Works had not built this number of engines.) 12x25½". L. C.

Locomotive (4-4-0), no cab, with coat of arms of the State of Massachusetts on sand box. James Hinkley, Del. Litho of J. H. Bufford & Co. (Road unknown) 18x24½". L.

BREESE & KNEELAND (N. Y. LOCOMOTIVE WORKS), JERSEY CITY, NEW JERSEY

Locomotive (4-4-0), "Baltic", built for the Hudson River R. R., 1854. Drawn by J. L. Hicks. Litho of Bien & Sterner. 18x32". L.

Locomotive (4-4-0), "Superior", built for the Hudson River R. R., 1854. Drawn by J. L. Hicks. Litho of Bien & Sterner. 18x32". E.

Locomotive (4-4-0) and tender—"Young America". C. Parsons, Del. Litho of Endicott. 1856. (Road unknown). 20½x32". L. C.

CAMDEN & AMBOY R. R.

Locomotive "Planet". E. L. Henry, Repro. 1834.

CRAMTON BROS.

Locomotive "Imperial". Litho of Chas. Hart. 23½x18¾". L. C.

DANFORTH, COOKE & COMPANY—PATERSON, NEW JERSEY

Locomotive (4-4-0), "Gov. Williamson". Drawn by J. H. Edwards. Litho of Bien & Sterner. (This locomotive was delivered to the New Jersey R. R. & Transportation Co. 1853.) 18½x32". L.

Locomotive (4-4-0), "Cataract City". James Cook, Del. Litho of T. Bonar. (Road unknown). 21½x33". L.

EASTWICK & HARRISON—PHILADELPHIA, PENNSYLVANIA

Locomotive (4-4-0), "Mercury", no cab. Drawn on stone by J. R. Roessli. Litho of P. S. Duval. (Delivered to Baltimore & Ohio R. R.) 1842. Plate I, Vol. V, 3rd series—Franklin Institute Journal. 14½x20½". L.

GLOBE WORKS (John Souther & Co.), BOSTON, MASSACHUSETTS

Locomotive (4-4-0) "Washington". Z. Colburn, Del. Litho of B. W. Thayer & Co. (Engine delivered to the Marietta & Cincinnati R. R., 1853). 20x28". L.

Locomotive (4-4-0) "Express". Litho of J. H. Bufford. (Locomotive delivered to South Reading Branch R. R., 1854). 21x30". L.

HINKLEY & DRURY—BOSTON, MASSACHUSETTS

Locomotive (0-4-0) "Lion". Litho of Thayer & Co. (Locomotive delivered to Nashua & Lowell R. R., 1844.) 20x28". L.

Locomotive (4-4-0) "Massachusetts". Ed. Herrlein, Engr. Litho of T. Sinclair. (Locomotive was delivered to the Boston & Maine R. R., 1846.) 14x23". L.

Locomotive (4-4-0). No Name. J. Hinkley, Del. Litho of B. W. Thayer & Co. 22½x30". L. C.

HINKLEY & WILLIAMS—BOSTON, MASSACHUSETTS

Locomotive—Shop No. 707. Litho of J. H. Bufford. (The records indicate that Shop No. 707 was delivered to the Peninsular of Wisconsin R. R., 1864.) 20x31½". L. T.

Locomotive (4-4-0) and tender. Shop No. 780. M. N. Forney, Del. Litho of J. H. Bufford & Co. (Locomotive delivered to the Chicago & North-Western Ry.—"Dakota". (12x27)". L.

Locomotive (4-4-0) and tender. Portrait of Holmes Hinkley on tender. Shop No. 780. See previous locomotive. 12x28". L. C.

Locomotive (4-4-0) and tender. Shop No. 925. Drawn by S. S. Frizzell. Litho of New England Lith. Co. (Locomotive delivered to the Boston, Hartford & Erie R. R.—"Fawn", 1869). 16½x26½". L. C.

Locomotive (4-4-0) and tender. D. Drummond, artist. Litho of C. H. Crosby & Co. (Road unknown) 16½x26". L.

Locomotive "Hinkley". Litho of C. H. Crosby & Co. 14x25½". L. C.

Lithograph of a Hinkley & Williams locomotive. 12x26¾". L.

Lithograph of Old Railroad Engine, built by Hinkley & Williams. Litho of J. H. Bufford. (Road unknown). L. C.

HUNNEMAN & CO.—BOSTON, MASSACHUSETTS

Hunneman & Co. Locomotive. Litho of L. H. Bradford. 18¾x30½". (Road unknown). L. C.

Hunneman & Co. Locomotive. Litho of J. H. Bufford. 15x23". (Road unknown). L. C.

J. H. JOHNSON—BOSTON, MASSACHUSETTS

Johnson Portable Engine. Litho of J. H. Bufford. 10¼x18". (Road unknown). L. C.

S. C. KING—SAINT LOUIS, MISSOURI

Locomotive "Columbia" #360. Litho of Folsom & King. 1882. 19x31½". (Road unknown). L. C.

LANCASTER LOCOMOTIVE WORKS—LANCASTER, PENNSYLVANIA

Locomotive "John C. Breckinridge" and tender. Litho of T. Sinclair. 1857. (Road unknown). L. C.

Locomotive "John C. Breckinridge" without tender. Litho of T. Sinclair. 1857. (Road unknown) 23¾x30". L. C.

LAWRENCE MACHINE SHOP—LAWRENCE, MASSACHUSETTS

Locomotive (4-4-0) "Lawrence" and tender. Shop No. 52, 1853. Drawn by A. S. Lederle. Litho of S. W. Chandler & Co. (Road unknown) 20x36½". L. C.

Lawrence, Passenger Engine. Litho of Chandler & Co. 1853. (Road unknown). 20x36½". L. C.

Locomotive (4-4-0) "Abbott Lawrence" and tender. Shop No. 97. Litho of L. H. Bradford. (A locomotive similar to the above was purchased by the Old Colony R. R. from the Lawrence Machine Shops in 1859. It was among the last built by this firm.) 19½x30½". L. C.

LOUISVILLE & CHICAGO R. R.

Locomotive "Traveller". Litho of J. Sage & Son. 1860. $15\frac{3}{4} \times 25\frac{1}{2}$ ". L. C.

LOWELL MACHINE SHOP—LOWELL, MASSACHUSETTS

✓ Locomotive (4-4-0) "Croton". Designed for the Hudson River R. R. by Walter McQueen. (This engine was delivered in 1851.) $19\frac{1}{2} \times 27$ ". L. C.

✓ Locomotive (4-4-0) "Columbia" and tender. 1852. Drawn by O. E. Cushing. Litho of Tappan & Bradford. (Delivered to the Hudson River R. R.) $20\frac{1}{2} \times 32$ ". L. C.

✓ Locomotive (4-4-0) "Mercury" and tender. 1852. O. E. Cushing, Del. Litho of Tappan & Bradford. (Delivered to the Syracuse & Utica R. R.) $20\frac{1}{2} \times 32$ ". L. C.

✓ Locomotive (4-4-0) "Leader". Shop No. 139. 1854. Litho of L. H. Bradford & Co. (Delivered to the Buffalo, Bayou, Brazos & Colorado R. R. in 1859) $20\frac{1}{2} \times 32\frac{1}{2}$ ". L. C.

✓ Locomotive (4-4-0) "Ariel". Shop No. 133. 1855. Drawn by O. E. Cushing. Litho of L. H. Bradford. (Delivered to the Boston & Providence R. R. under the name "Sharon" in 1859) 21×32 ". L. C.

McKAY & ALDUS IRON WORKS—EAST BOSTON, MASSACHUSETTS

✓ Locomotive (4-4-0) "Nathaniel McKay" and tender. Litho of J. H. Bufford. (Road unknown). $14 \times 24\frac{1}{2}$ ". L. C.

✓ Locomotive (4-4-0) "Arkansas" and tender. Western scene on the Little Rock & Fort Smith R. R. H. Thomas O. Drummond, Del. Litho of Chas. H. Crosby & Co. $18 \times 29\frac{3}{4}$ ". L. C.

MANCHESTER LOCOMOTIVE WORKS—MANCHESTER, NEW HAMPSHIRE

✓ Locomotive (4-4-0) "Pioneer" and tender with view of Manchester Locomotive Works. 1855. Louis Meyer, Del. Litho of J. H. Bufford. (This was the first locomotive built at this plant and was delivered to the Central Military Tract R. R.—"Cossack") 24×31 ". L. C.

✓ Locomotive (4-4-0) and tender. View of plant at Manchester, N. H. 1856. Litho of J. H. Bufford. (Road unknown) $20\frac{1}{2} \times 30\frac{3}{4}$ ". L. C.

WILLIAM MASON—TAUNTON, MASSACHUSETTS

✓ Locomotive (4-4-0) "W. G. Armstrong". Litho of L. H. Bradford & Co. (Engine delivered to the Jeffersonville & Indiana R. R., Oct. 15, 1853, Shop No. 2.) L. C.

✓ Locomotive (4-4-0) "Amazon". Litho of L. H. Bradford & Co. (Engine delivered to the Lake Erie, Wabash & St. Louis R. R., Apr. 1, 1856, Shop No. 39). 24×36 ". L. C.

✓ Locomotive (4-4-0) "Phantom" and tender. Litho of L. H. Bradford & Co. (Engine delivered to the Toledo & Illinois R. R., Feb. 2, 1857, Shop No. 59). 23×38 ". L. C.

✓ Locomotive (4-4-0) "Highland Light" and tender. S. S. Frizzell, Artist, Litho of Chas. H. Crosby. (Locomotive delivered to the Cape Cod Central R. R., Nov. 14, 1867, Shop No. 273). 22×30 ". L. C.

✓ Locomotive (0-6-6-0) "Janus" and tender. Wright, Engr. (Locomotive delivered to the Lehigh Valley R. R., Dec. 1871, Shop No. 438). $9\frac{1}{4} \times 15\frac{3}{4}$ ".

Mason & Co's. Locomotive Works. Litho of J. H. Bufford. $15\frac{3}{4} \times 24\frac{3}{4}$ ". L. C.

MILWAUKEE & MISSISSIPPI R. R.

✓ Locomotive (4-4-0) "Milwaukee" and tender. Litho of Siefert. (Locomotive originally built by the Schenectady Locomotive Works in 1852, shown as rebuilt by C. Manning, M. M., M & M R. R., 1859). 24×39 ". L. C.

**MOORE & RICHARDSON (Cincinnati Locomotive Works)—
CINCINNATI, OHIO**

Locomotive (4-4-0). $21\frac{1}{2} \times 40"$. No information on this lithograph. (This engine has been identified as being delivered to the Little Miami R. R. under the name—"Nathan Wright.")

NASHVILLE, CHATTANOOGA & ST. LOUIS RAILWAY

✓ Locomotive (4-4-0) and tender—"General"—famous war engine on Western & Atlantic R. R., now on exhibition at Chattanooga. $12 \times 19"$. L. C.

Locomotive #535—"Marie". History of locomotive and prayer used in christening shown. $15\frac{1}{2} \times 25\frac{1}{2}"$. L. C.

NEW CASTLE MANUFACTURING CO.—NEW CASTLE, DELAWARE

✓ Locomotive (4-4-0) "Philadelphia", 1852. $18 \times 23\frac{1}{2}"$. (We know that there was a locomotive furnished the Philadelphia, Wilmington & Baltimore R. R., bearing this name during this year by this concern) L.

**NEW JERSEY LOCOMOTIVE & MACHINE CO.—PATERSON,
NEW JERSEY**

✓ Locomotive (4-4-0) "Talisman." T. W. Hayes, Del. G. Weissenborn's Engraving Office. (Road unknown). $17 \times 26"$. L.

✓ Locomotive (4-4-0) "Empire State." Zerach Colburn, Del. Litho of Bien & Sterner. (Engine built for the New York Central R. R.) $16 \times 23\frac{1}{2}"$. L.

NILES & COMPANY—CINCINNATI, OHIO

✓ Locomotive (4-4-0) "Queen City"—Shop No. 100. Drawn and designed by John L. Whetstone, Litho of Middleton, Wallace & Co. (Road unknown). $20 \times 32\frac{3}{4}"$. L.

NORRIS BROTHERS—PHILADELPHIA, PENNSYLVANIA

Locomotive (4-4-0) "Chesapeake"—no cab. A. Kollner, Sc. Litho of P. S. Duval. (Locomotive delivered to the Philadelphia & Reading R. R., 1847). $16 \times 20\frac{1}{2}"$. L.

Freight Locomotive. Litho of Duval. (Road unknown). $13\frac{1}{2} \times 19\frac{1}{2}"$. L.

Norris Brothers Engine. Litho of P. S. Duval. (Road unknown) $16 \times 20\frac{1}{2}"$. E.

RICHARD NORRIS & SON—PHILADELPHIA, PENNSYLVANIA

✓ Locomotive (4-4-0) "Auburn." Litho of L. N. Rosenthal, 1855. (In 1854 this concern delivered an engine under this name, answering this description to the Philadelphia & Reading R. R.) Two sizes are known to exist— $11\frac{1}{2} \times 17\frac{1}{2}"$ and $9 \times 14\frac{3}{4}"$. L. C.

✓ Locomotive (4-6-0) built in 1856 for the Ohio & Indiana R. R. Drawn and executed on stone by L. Haugg. Litho of A. Brett. $11\frac{3}{4} \times 16\frac{3}{4}"$. L. C.

✓ Locomotive (4-4-0) "S. Meredith," built in 1856 for the Cincinnati & Chicago R. R. Drawn and executed on stone by L. Haugg. Litho of A. Brett. $17 \times 21"$. L.

✓ Locomotive (4-4-0) "Sagua la Grande." Drawn and executed on stone by L. Haugg. Litho of A. Brett. 1856. (Road unknown) $14\frac{1}{2} \times 19"$. L. C.

✓ Locomotive (4-4-0) "Wyoming", improved coal burning passenger engine No. 3. From nature and on stone by L. Haugg. Litho of A. Brett. $15 \times 23"$. L. C.

✓ Locomotive (0-8-0) "Union", combined engine. Drawn by Richard Otley. Litho of L. N. Rosenthal. $19 \times 27"$. (Road unknown). L.

✓ Locomotive (2-6-0), freight, for Pennsylvania R. R. Drawn by E. A. Page. Litho of L. N. Rosenthal. $18\frac{1}{2} \times 29\frac{1}{2}"$. L.

✓ Locomotive (4-4-0), wood burner, no cab, express passenger. Drawn by Richard Otley. Litho of L. N. Rosenthal. (Road unknown). $20\frac{1}{2} \times 28\frac{1}{2}"$. L.

- ✓ Locomotive (4-4-0), express passenger. Drawn by Richard Otley. Litho of L. N. Rosenthal. (Road unknown). $20\frac{1}{2} \times 28\frac{1}{2}$ ". L.
- ✓ Locomotive (4-4-0), freight, outside connected, wood burner. Litho of L. N. Rosenthal. (Road unknown). $11 \times 16\frac{3}{4}$ ". L.
- ✓ Locomotive (4-6-0) freight. Drawn and on stone by L. Haugg. Litho of A. Brett. (Road unknown). $12 \times 16\frac{3}{4}$ ". L. C.
- Norris Express Locomotive. Litho of A. Brett. (Road unknown). $11\frac{3}{4} \times 16\frac{3}{4}$ ". L. C.
- ✓ Express Passenger Locomotive. Drawn from nature . . . Litho of A. Brett. (Road unknown). L. C.

WILLIAM NORRIS & CO.—PHILADELPHIA, PENNSYLVANIA

- ✓ Locomotive (4-4-0) improved eight wheel, with patent flexible truck, 1843. Drawn on stone by J. R. Roessli. Litho of P. S. Duval. (Road unknown). 16×24 ". L. C.
- Philadelphia Railroad Engine. $14\frac{1}{2} \times 16\frac{1}{2}$ ". L. C.
- Locomotive "Virginia". German Publication. (Road unknown). $11\frac{1}{2} \times 16$ ". E.
- Locomotive "Washington". German Publication. (Road unknown). $11 \times 14\frac{1}{2}$ ". E.

PHILADELPHIA & READING RAILROAD

- ✓ Locomotive (4-4-0), "Illinois." James Milholland, Patent. D. H. Ferger, Del. Litho of P. S. Duval. 18×31 ". E.

PORTLAND COMPANY'S WORKS—PORTLAND, MAINE

- ✓ Locomotive (4-4-0), "State of Maine," no cab, 1851. F. W. Cummings, Del. Litho of J. H. Bufford. (This is thought to be the "Railway King," delivered to the Atlantic & St. Lawrence R. R.) 20×27 ". L. C.
- Locomotive (4-4-0), Shop No. 85, 1854. G. F. Morse, Del. Litho of J. H. Bufford. (Shop No. 85 was the "Shelburne," delivered to the Grand Trunk Ry. Sep. 9, 1856). 21×33 ". L. C.
- Locomotive "Eagle." Litho of G. R. Davis. (Road unknown) $21\frac{1}{2} \times 34$ ". L.
- Locomotive "Forest State." Litho of J. H. Bufford. (Road unknown). $16\frac{1}{2} \times 26$ ". L. C.
- ✓ Locomotive "Minnehaha." G. F. Morse, Del. Litho of J. H. Bufford 1856. (Road unknown). L. C.

ROGERS, KETCHEM & GROSVENOR—PATERSON, NEW JERSEY

- Locomotive "Juno." Litho of P. R. Hodge, 1839. (The Rogers records do not indicate the construction of a locomotive under this name. It is undoubtedly a lithograph of one of their earliest engines.) $10\frac{3}{4} \times 21\frac{1}{4}$ ". L. C.
- Locomotive "New York." Litho of Endicott & Co. (The Rogers records indicate several engines of this name—

- Shop No. 40 built for Housatonic R. R. in 1842
- 71 built for Long Island R. R. in 1845
- 128 built for Hartford & New Haven R. R. in 1848
- 143 built for Paterson & Ramapo R. R. in 1848
- 348 built for Western & Atlantic R. R. in 1852
- 404 built for Central R R & Banking Co. in 1853
- 450 built for Gov. Morris in 1853

Without additional information, it would be impossible to identify which of the above roads received this engine.) $26\frac{1}{4} \times 40$ ". L. C.

Locomotive (4-4-0) "Victory." Litho of Endicott & Co. (Although there were two engines delivered under this name, we believe this was delivered to the Hartford & New Haven R. R. in 1850.) L.

Locomotive (4-4-0) "New Jersey." J. C. Pennington, Del. Litho of Endicott & Co. (The records indicate three engines delivered under this name—

Shop No. 324 built for Central R R of New Jersey in 1852
351 built for Western & Atlantic R. R. in 1852
485 built for Great Western (Ill.) R. R. in 1855

Without additional information it would be impossible to identify which of the three roads received this engine.) $24\frac{1}{2} \times 40"$. L. C.

Locomotive (0-6-0) "Volcano." (Delivered to the Buffalo & Erie R. R. in 1855.) $11 \times 16"$. L.

ROGERS LOCOMOTIVE & MACHINE WORKS— PATERSON, NEW JERSEY

✓ Locomotive (4-4-0) "Thos. Rogers." Litho of J. Bien. (Although there were two locomotives built bearing this name, we believe this is the one delivered to the Charleston & Savannah R. R. in 1860.) $8 \times 13"$. This same engine was also lithographed by Endicott & Co., $24 \times 36"$. L. C.

✓ Locomotive (4-4-0) "Paterson." Litho of Endicott & Co. (Believed to have been delivered either to the New Jersey R. R. & Transportation Co. or to the Erie Ry.) $22\frac{3}{4} \times 33\frac{1}{2}"$. L. C.

SCHENECTADY LOCOMOTIVE WORKS— SCHENECTADY, NEW YORK

✓ Locomotive and tender, Shop No. 29, 1853, designed and built for the Utica & Schenectady R. R. Engr. on stone by Ed. Deicke. Litho of J. Bien. $17 \times 37"$. L.

Anglo American Locomotive. Litho of Day & Son. $12 \times 23\frac{1}{2}"$. L.

Locomotive "President." Litho of Bien & Sterner. $20\frac{7}{8} \times 33\frac{3}{4}"$. L.

SMITH & PERKINS—ALEXANDRIA, VIRGINIA

Locomotive "Goliath." Litho of Endicott & Co. (Road unknown). $22\frac{3}{4} \times 42\frac{1}{2}"$. L.

WILLIAM SWINBURNE—PATERSON, NEW JERSEY

✓ Locomotive (4-4-0) "Paterson," 1855. John Swinburne, Del. Litho of Bien & Sterner. (Road unknown). $19 \times 27\frac{1}{2}"$. L.

Swinburne Engine. Litho of Bien & Sterner. (Road unknown). L.

TAUNTON LOCOMOTIVE WORKS—TAUNTON, MASSACHUSETTS

✓ Locomotive (4-4-0). Litho of J. H. Bufford. (This is a lithograph of the "Rough & Ready," first engine built by this concern, for the Eastern R. R., in 1847.) L. C.

✓ Locomotive (4-4-0) "Calumet" and tender, Shop No. 223. Litho of J. H. Bufford. (We believe this engine was delivered to the La Crosse & Milwaukee R. R., in 1857.) $19 \times 30\frac{1}{4}"$. L.

✓ Locomotive (4-4-0) "President" and tender. Litho of J. H. Bufford. (We believe this engine was delivered to the New York & Harlem R. R., in 1865.) $12\frac{1}{2} \times 23\frac{1}{2}"$. L.

✓ Locomotive (4-4-0) "New England" and tender. Litho of J. H. Bufford. (So far as we know, no engine was built at these works under this name—road unknown.) $20 \times 28\frac{1}{2}"$. L.

✓ Locomotive (4-4-0) and tender, inside connected, wood burner. P. I. Perrin, Del. Litho of J. H. Bufford. (Road unknown). $15 \times 28"$. L.

✓ Locomotive (4-4-0) "Northender." Chas. F. Thomas, Del. (A most interesting example of what a lithograph is not. The measurements of this lithograph and its appearance, coincide with the lithograph of the "Gen'l Stark" of the Amoskeag Manufacturing Co. It is not a Taunton product and no record of an engine of this

name appears in their records. It would appear that the stone used for the "Gen'l Stark" was used for making this lithograph—the only difference being in the change in name of the engine and the name of the concern.) $31\frac{1}{2} \times 43\frac{1}{2}$ ". L. C.

TRENTON LOCOMOTIVE WORKS (VAN CLEVE, McKEAN, DRIPPS & CO.) TRENTON, NEW JERSEY

✓ Locomotive (4-4-0) "Assanpink." Litho of T. Sinclair. (Built for the Belvidere & Delaware R. R., in 1855). $18 \times 25\frac{1}{4}$ ". Eng. C.

WARREN—CHARLESTOWN, MASSACHUSETTS

Warren Engine No. 4. Litho of J. H. Bufford, 1861, $17 \times 25\frac{1}{2}$ ". L. C.

WESTERN (Great) RAILWAY OF CANADA

Locomotive (0-6-0) "Scotia", No. 90. First locomotive in Canada with a steel boiler. Litho of J. Ottman. (Built by the Great Western Ry. of Canada in their Hamilton Shops, 1861). L. C.

SETH WILMARTH (Union Works)—SOUTH BOSTON, MASSACHUSETTS

✓ Locomotive (4-4-0) "New York." Drawn by A. Becker. Litho of Nagel & Weingartner. (This locomotive was delivered to the Hudson River R. R. in 1851). $17\frac{1}{2} \times 31\frac{1}{2}$ ". L.

ROSS WINANS—BALTIMORE, MARYLAND

Ross Winans Engine, 1852. 11×20 ". (Road unknown). E.

Ross Winans Engine. Litho of Hoen & Co. (Road unknown). $13\frac{1}{2} \times 21$ ". L.

MISCELLANEOUS

Locomotive "America". Water color drawing. $14\frac{1}{2} \times 25$ ".

Locomotive "Americane." Litho of La Handier, 1867. $8\frac{3}{4} \times 12\frac{1}{2}$ ". L.

Locomotive "Kit Carson." Litho of Brooks & Day. $9\frac{1}{2} \times 14\frac{3}{8}$ ". L. T.

No doubt there are some duplications, many omissions and some errors in the above list. If any of our readers can correct or add to this list, we will appreciate the information.

PRINTS

Many of the early prints (not photographs), depicting American scenes with trains or locomotives, or simply trains and locomotives, are of genuine interest. Here again Mr. Herman Wunderlich of Kennedy & Co., New York, has come to our aid in furnishing us with data from his files. The most interesting and probably the most accurate were those prints published by Messrs. Currier & Ives and these will be listed separately.

CURRIER & IVES

"American Express Train." Locomotive and train on the Hudson. F. F. Palmer, Del. 18×31 ". 1864. L. C.

"The Lightning Express." Locomotive and four cars. $13\frac{3}{4} \times 17\frac{1}{2}$ ". L. C.

"The Great West." Railroad train leaving the Rockies and crossing the plains. $8\frac{3}{4} \times 11\frac{1}{2}$ ". 1870. L. C.

"Through to the Pacific." View of the far west depicting the plain and lumber industries with a view of the Rockies and San Francisco. $8 \times 12\frac{1}{2}$ ". 1870. L. C.

"The Express Train." Railroad scene, bridge to the left. $8 \times 12\frac{1}{2}$ ". 1870. L. C.

"Route to California." Railroad scene, Truckee River, Sierra Nevada. $8\frac{3}{8} \times 12\frac{1}{2}$ ". 1871. L. C.

"Ice Boat Race on the Hudson." $8\frac{1}{2} \times 12\frac{1}{2}$ ". L. C.

"Snowbound." Railroad scene. $8\frac{1}{2} \times 12\frac{1}{2}$ ". 1871. L. C.

- "Prairie Fires of the Great West." Locomotive (4-4-0) and train crossing burning prairie, fire and herd of buffaloes in background. $8\frac{3}{8} \times 12\frac{1}{2}$ ". 1871. L. C.
- "Across the Continent, Westward the Course of Empire takes its way." Railroad Scene. J. M. Ives, Del. Drawn by F. F. Palmer. $17\frac{3}{4} \times 27$ ". L. C.
- "Accommodation Train." 9×13 ". 1875. L. C.
- "American Express Trains—Leaving the Junction." Railroad scene. 14×22 ". 1872. L. C.
- "Night Scene at the American Railway Jct." (Lightning Express, Flying Mail and Owl trains). $20\frac{1}{2} \times 33\frac{3}{4}$ ". 1876. L. C.
- "The Express Train." Railroad Scene. $17\frac{3}{4} \times 26\frac{3}{4}$ ". 1859. L. C.
- "The Express Train #127." Railroad Scene. 9×15 ". L. C.
- "The Great Race for Western Stakes." Railroad Scene. $9 \times 13\frac{1}{2}$ ". 1870. L. C.
- "The Great West." Railroad Scene. $8 \times 12\frac{3}{8}$ ". 1870. L. C.
- "The Lightning Express Trains." Railroad scene. $17\frac{3}{4} \times 27\frac{3}{4}$ ". 1863. L. C.
- "The Start of the Night Express." Locomotive (4-4-0) and train. $8\frac{1}{2} \times 12\frac{3}{4}$ ". L. C.
- "The Through Express." $7 \times 13\frac{3}{4}$ ". L. C.
- "The Lightning Express leaving the Junction." Two 4-4-0 types of locomotives showing the train of one of them. L. C.
- "Pennsylvania Railroad Scenery." Train on mountain. $8\frac{1}{2} \times 12\frac{1}{2}$ ". 1870?. L. C.
- "The Erie Railway, Hornellville." Three passenger trains. $19 \times 31\frac{3}{4}$ ". 1876. L. C.
- "Railroad Scene—Adams Express Company." Locomotive (4-4-0) "W. B. Dinsmoor," Adams Express car and three passenger cars. C. Parsons, Del. $16 \times 25\frac{1}{2}$ ". 1855. L. C.
- "More Plucky than Prudent." Bull on the track in front of a railroad train. Caricature. $9 \times 12\frac{3}{4}$ ". 1885. L. C.
- "Blood will tell." Race between horse and rider and steam train. Caricature. 9×13 ". 1879. L. C.
- "A Wild Cat Train." (No Stop Overs. Choke-em off Station. Scoot for the Train when the Gong Sounds). Caricature. $9\frac{1}{2} \times 13\frac{1}{2}$ ". 1884. L. C.
- "A Nightmare in the Sleeping Car." Caricature. $10\frac{1}{2} \times 13$ ". L. C.
- "Crossed by a Milk Train." $9\frac{3}{4} \times 14$ ". 1884. L. C.
- "The Danger Signal." 17×26 ". 1884. L. C.
- "A Limited Express." 10×14 ". 1884. L. C.
- "Lookout Mountain, Tennessee. Chattanooga R. R." 15×20 ". 1866. L. C.
- "A Mule Train on the Down Grade." 8×13 ". 1881. L. C.
- "A Mule Train on the Up Grade." 8×13 ". 1881. L. C.
- "Off His Nut." 9×13 ". 1886. L. C.
- "The Progress of the Century." $9 \times 12\frac{1}{2}$ ". 1876. L.
- "The Go Ahead Principle." (Advertisement). 9×15 ". 1870. L.
- "The Through Express." $8 \times 12\frac{1}{2}$ ". 1870. L. C.
- "The Statute Unveiled or the Colossus of Roads." 1869. L.

MISCELLANEOUS PRINTS —

- "The Abolition Catastrophe." (Political Cartoon) Litho of Bromley & Co. 1864. $14\frac{1}{2} \times 19\frac{1}{2}$ ". L. C.
- "The Dreadful Accident of the North Pennsylvania R. R., 14 minutes from Philadelphia, July 17, 1856." Litho of John L. Magree. 9×13 ". L.
- "Accident near Burlington, New Jersey on Camden & Amboy R. R., Aug. 29, 1855." Litho of J. Collins. $7 \times 11\frac{3}{4}$ ". L.
- "Accident on the B & O R. R." Litho of Hullmandel & Walton. 1853. $6\frac{1}{2} \times 4$ ". L. T.
- "Across the Continent." Woodcut of Jos. Becker. 14×20 ". C.
- "Across the Continent." (Central Pacific) Litho of Schile & Co. 1870. $17\frac{1}{2} \times 25\frac{3}{4}$ ". L. C.
- "Across the Continent." (Passing the Humboldt River). Litho of Schile & Co. 1870. $6 \times 10\frac{3}{4}$ ". L. C.
- "Across the Continent." (On black with gilt lines and letters). Litho of Schile & Co. 1870. $17 \times 24\frac{1}{2}$ ". L. C.

- "Altoona, Pa., Kittaning Point." Woodcut. 9x12½".
- "American Express Trains—Leaving the Junction." Litho of Yates & Co. (Copy of Currier & Ives). 1872. 14x22". Chromo L.
- "American Express Trains." Litho of Yates & Co. 1872. 14x22". L. C.
- "America." Engr. of Rawdon, Wright. 1½x4½".
- "Armored Car & Train of B & O R. R." 9¼x14". Wood Engr. C.
- "The Ashtabula Disaster." (Shows side view of locomotive "Columbia," #360 and insert of bridge before and after disaster). Pub. by G. D. Folsom and S. C. King, 1882. 22x32". L.
- "Away to the 'Front'." Litho of MacLure, MacDonald & MacGregor. 8x12". L. C.
- "The Baldwin Works." Produced by Sartain. 14x4". Mezzo.
- "Baltimore & Ohio R. R.—Buzzards Rock." Litho of M. Swett. 8x8". L.
- "Baltimore & Ohio R. R.—Patterson Viaduct." Litho of M. Swett. 7x9". L.
- "Baltimore & Ohio R. R.—Tarpean Rock." Litho of M. Swett. 8x8". L.
- "Baltimore & Ohio R. R.—Carrolton Viaduct." Litho of Endicott & Swett. 7x9". L.
- "Baltimore & Ohio R. R.—Passenger and Freight Engine." Engr. of Day & Son, 1857. 12x28½". Engr.
- "P. T. Barnum's Circus Train." Litho of H. A. Thomas. 17x25½". L. C.
- "Black Valley R. R." Litho of E. Ackerman, 1863. 11¾x15¾". L. C.
- "Black Valley R. R." Litho of E. Ackerman, 1863. 12x16". L. C.
- "Black Valley R. R." Litho of J. H. Bufford, 11x19". L. C.
- "Black Valley R. R." Litho of New England Litho Steam Printing Co., 1868. 11x19". L. C.
- "Boston & Providence R. R., Park Square Station, Boston." Hatch Litho. Co. 19½x23½". L. C.
- "Camden & Atlantic." (Broadside). Produced by Broadhead, 1861. 17x21". Woodcut.
- "Camden Town—View from Bridge." Produced by N. Fielding. A. C.
- "Camp at Melville, Md." Litho of Sachse & Co. 15½x24½". L. C.
- "Canada Southern Train." Litho of Chicago Litho. Co. 15¾x26¾". L. C.
- "Citizens Volunteer Hospital, Cor. Broad Street and Washington Ave., Philadelphia." Shows outside and interior view of hospital with wood burning locomotive. Litho of P. S. Duval & Son. 15½x11½". L. C.
- "Chicago & Atlantic Railway." 22x26½". L. C.
- "Chicago & North-Western R. R." Litho of Horton & Leonard, 13x20¾". L. C.
- "Chicago & St. Louis R. R." Litho of Clapp, Mathews & Co. 1857. 26x20". Chromolith.
- "Chicago, Rock Island & Pacific R. R." Litho of Colton. 1870. 26x18½". Engr. Colored.
- "Completion of Pacific R. R." 1869. 10½x15¼". Zincotype.
- "Coney Island." Litho of Hart. 26x19". L. C.
- "View of the 'De Witt Clinton,' the first steam passenger train in America." (Description of passengers and first trip). Copy from the original in the Connecticut Historical Society, Hartford, Connecticut. 11½x18½". Black print.
- "Eagle Gap—Central Pacific R. R." Litho of J. Gemmell. L. C.
- "Engine." Litho of Morgan & Co. 1874. 17x32". L.
- "Engine 'Thatcher Perkins'" (B & O R. R.) J. Snowden Bell, Del. 1865. 16¾x30½". L.
- "The Express Train." Litho of Day & Son. 7x14½".
- "The Exposition Flyer." Litho of American Art Co. 1893. 7½x13¾". L. C.
- "The Fast Mail." (L S & M S #317, 4-4-0) Litho of Clay, Cossack & Co. 1875. 21x20½". L. C.
- "The Ferry Landing at Jersey City." Litho of H. R. Robinson, 1848? 10x20¾". L.
- "First Steam Railroad Train in America." Produced by Antiques Pub. Co., 1870. 14x18¾". Wood Engr.
- "First American Railway Train." Litho of Leggo & Co. 1866. 10¾x18". L.
- "First American Railway Train." Litho of Roberts & Reinhold. 14x20". L.
- "First Railway Train in Pennsylvania." Litho of P. F. Goist, 1883. 6x9". L.
- "First Locomotive." (American Steam Train, steam boat, etc., with brief description of each). 1870. 14x17". Wood cut.

- "M. Fisher & Co's. Locomotive." Litho of Endicott & Co. $9\frac{1}{2} \times 13"$. L.
- "Fitchburg R. R.—Rapid Transit. Hoosac Tunnel Route." (F. R. R. #61 emerging from the Hoosac Tunnel and a train which has entered save for a Wagner Palace Car). Litho of C. Frank King. $24 \times 29\frac{1}{2}"$.
- "Certificate of the Franklin Institute." Engr of Sartain. $14 \times 4"$. Mezzo.
- "From the Inclined Plane near Philadelphia." Litho of John Collins, $5 \times 6\frac{3}{4}"$. L.
- "Great Central Fast Route via Beggartown, Demon Line and Black Valley to Destruction." Litho of J. H. Bufford. $15\frac{3}{4} \times 19\frac{1}{2}"$. L.
- "Great Northern Ry.—The Oriental Limited—A Vision Realized." ("Wm. Crooks" and train with modern locomotive in background. $20 \times 24"$. L. C.
- "Harrisburg Cumberland R. R. Bridge." Litho of Hickock & Cantine, 1844. $9 \times 14\frac{1}{2}"$. L. C.
- "Profile of Hoosac Mountain Tunnel." Litho of J. B. Richards. $27\frac{1}{2} \times 9"$. L. C.
- "Hoosac Tunnel." Litho of D. Drummond, 1874. $27 \times 20"$. Chromo L.
- "Illinois Central R. R. Passenger Depot." Litho of Kellogg. $8 \times 12"$. L. C.
- "Invasion of Pennsylvania." Produced by Berghaus. $8\frac{1}{2} \times 14"$. Woodcut C.
- "Jersey City Locomotive Works." Litho of Endicott & Co. $6\frac{1}{2} \times 12\frac{1}{4}"$. L. C.
- "Fred Jones Shoe Factory, Plymouth, Mass." Litho of Buffords Sons. $18 \times 23\frac{1}{2}"$. L. C.
- "Lake Shore & Michigan Southern R. R." Produced by Chapin. $8\frac{3}{4} \times 20\frac{3}{4}"$. Woodcut.
- "Lake Shore & Michigan Southern." Litho of Clay, Cossack & Co. 1875. $20 \times 26\frac{1}{2}"$. L. C.
- "Lake Shore & Michigan Southern R. R." (L S & M S #604, 4-6-0 type, drawing the "Twentieth Century Limited"). $14 \times 21"$. L. C.
- "Lazell, Perkins & Co., Bridgewater, Mass." (The train in the foreground is the "Fall River Line Steamboat Express" about 1850). Litho of J. P. Newell. $14 \times 20"$. L.
- "Lehigh Valley R. R.—Black Diamond Express—Handsomest Train in the World." Engr. by J. A. Lowell & Co., 1897. $19\frac{1}{2} \times 29\frac{1}{2}"$. Engr.
- "Little Falls"—Railroad Scene. Produced by Sands after Bartlett, 1838. $4\frac{3}{4} \times 7"$. A. C.
- "Locomotive 'Seraing.'" $8\frac{3}{4} \times 12"$. L. C.
- "Lookout Mountain near Chattanooga, Tenn." Litho of Donaldson & Elmes, 1864. $15\frac{3}{4} \times 10"$. L.
- "The Mail Train." Litho of Packer & Griffin. $10\frac{1}{2} \times 8"$. L. C.
- "Marine Railway around Falls of Niagara." Litho of T. Bonar. L.
- "The Meeting of the Ways." (New York Central R. R.) Colored print from the painting of Stanley M. Arthurs. $7 \times 14"$. L. C.
- "Michigan Central R. R. Train at Niagara Falls." Litho of American Litho. Co., 1924. $15 \times 25"$. L. C.
- "Military Post, Cowan, Tennessee." Litho of Henry Eno. $9 \times 13\frac{1}{2}"$. L. C.
- "Moonlight Scene in the Far West." Litho of Orcutt Litho. Co., $16 \times 25\frac{1}{4}"$. Chromo L.
- "Mount Clement—C. S. S. R." Litho of A. Hoen & Co., $6\frac{1}{4} \times 9\frac{1}{2}"$. L. C.
- "Mount Joy Manufacturing Co." Litho by Kollner. $15\frac{1}{4} \times 21\frac{3}{4}"$. L. C.
- "New London, Willimantic & Palmer R. R.—Excursion to Palmer." $11 \times 18"$ Broadside. L.
- "New York Central & Hudson River R. R." Litho of Clay, Cossack & Co. $17\frac{1}{4} \times 25\frac{1}{2}"$. L. C.
- "New York Central & Hudson River R. R.—The Twentieth Century Limited." N. Y. C. #2980, 4-4-2. Litho of Photograph & Color Co. $18 \times 26"$. L.
- "New York, New Haven & Hartford R. R." Produced by Wm. J. Haley, $5\frac{1}{4} \times 10"$. Wood Engr.
- "Ninth Annual New England Fair at Lowell, Mass." Litho of C. H. Crosby & Co., 1872, $15\frac{1}{2} \times 22"$. L. C.
- "Northern R. R. Over Salmon River." Produced by Hofman. $4 \times 7"$ Wood Engr.
- "Panama R. R.—Culebra." Litho of C. Parson & Endicott, 1854. $10 \times 14"$. L.
- "Panama R. R.—View of Culebra or the Summit." Litho of C. Parsons, 1854. $10 \times 14"$. L.
- "View of the Peaks of Otter, Virginia." Litho of Rau & Son, 1858, $10\frac{1}{2} \times 16\frac{3}{4}"$. L. T.

- "Pennsylvania R. R. Train at New Brunswick." Litho of Chas. Hart. L. C.
 "Pennsylvania Railroad Bridge." Litho of Herline & Hensel. 15x23 $\frac{3}{4}$ ". L. C.
 "Pennsylvania Railroad Bridge over the Susquehanna." Litho of Herline & Hensel. 15 $\frac{1}{4}$ x24". L. C.
 "View of Philadelphia, Wilmington & Baltimore R. R. track across the Susquehanna River at Havre de Grace, Maryland, on the ice, 1852." 16x26". L.
 "Pullman Palace Car Company's Works at Detroit, Michigan." Litho of The Graphic Co. 18 $\frac{1}{4}$ x32 $\frac{1}{2}$ ". L. C.
 "Map of the Quincy Railroad." 8 $\frac{3}{4}$ x11 $\frac{5}{8}$ ". L.
 "The Quincy (Mass.) Railroad." Litho of Pendleton. 5 $\frac{1}{2}$ x9". L.
 "Railroad Battery on the Philadelphia, Wilmington & Baltimore R. R." 9x14 $\frac{1}{2}$ ". Engr. C.
 "Railroad Depot at Philadelphia." Litho of C. E. Blake. 8 $\frac{3}{4}$ x5 $\frac{1}{2}$ ". L.
 "Railroad with Train, Covered Wagon and Mail Coach." Litho of Kley. 23x31 $\frac{1}{2}$ ". L. C.
 "Refreshment Rooms and Hotel." Litho of H. G. Andrews. 5 $\frac{1}{2}$ x9". L. C.
 "Saratoga Springs Railroad Depot." Litho of Endicott & Co. 7 $\frac{1}{4}$ x10 $\frac{3}{4}$ ". L.
 "Stone Mountain, De Kalb Co., Georgia." Litho of Huppenheimer. 16 $\frac{1}{2}$ x22 $\frac{1}{4}$ ". L. C.
 "Ten Minutes for Refreshments." Litho of A & P Tea Co., 1886. 19x31". L. C.
 "Track Across the Susquehanna River." Litho of Sinclair. 16x26". L. T.
 "Tracy City, Tennessee." Litho of H. C. Eno. 7x10 $\frac{3}{4}$ ". L. C.
 "Trains Rounding a Curve." (Two going to the left, four track line, moonlight scene). 14x21 $\frac{1}{2}$ ". L. C.
 "The Tray Run and Buckeye Hollow Viaducts." Litho of Sachse & Co. 11 $\frac{1}{2}$ x17". L. C.
 "Union Pacific Railroad." (Opening). German Titles. 21x26 $\frac{3}{4}$ ". L.
 "The Union Pacific Railroad." Litho of Haskell & Allen, 1872.
 "View of First American Railway." Litho of Roberts & Reinhold, 1865. 9 $\frac{3}{4}$ x17". L.
 "View of the First American Railway Train." Litho of Sage Son & Co., 1865. L.
 "Volunteer Refreshment Saloon at Philadelphia." Litho of W. Boell, 1861. 18x21 $\frac{1}{2}$ ". L. C.
 "Wason Manufacturing Co., Springfield, Mass." Engr. of N. J. Allan. 4 $\frac{1}{2}$ x6 $\frac{3}{4}$ ". Engr.
 "Wheelock's Patent Steam Cylinder Packing." Litho of Crosby. 23x29". L. C.

Legend

L=Lithograph in black and white. C= Colored E=Etching A=Aquatint
 T=Tinted Engr=Engraving

MUSIC

The railroad has been the subject of many a musical composition as the occasion demanded or circumstances permitted. The covers of many of these musical compositions contain many interesting railroad scenes. How many of these musical compositions were published, we have no accurate knowledge, but here is a partial list.

GALOP

- "New Express Galop." George T. Evans, Comp. 1869. Dedicated to the lady patrons of the Pacific Union Express Company. 5 pp.
 "Express Galop." A. Silberberg, Comp. Dedicated to Geo. W. Howe. 7 pp.
 "The Express Galop." Chas. D'Albert, Comp. Dedicated to W. B. Dinsmore. Title page only.
 "Night Express Galop." Maurice H. Strong, Comp. 5 pp.
 "The Railroad Kings' Galop." J. Hardinge, Comp. 5 pp.
 "Fast Line Galop." Jas. N. Beck, Comp. Dedicated to the President and Directors of the Great Pennsylvania Central R. R. 5 pp.
 "The Mail Train Galop." C. Coote, Jr. Comp. 5 pp.

- "Union Pacific Galop." Albert H. Fernald, Comp. Dedicated to S. S. C. Robinson, 1870. Title Page Only.
- "Gliding on the Rails." Frank Dumont and W. S. Mullaly, Comps. 1881. 7 pp.
- "Rapid Transit Galop." A. H. Rosewig, Comp. 1875. 5 pp.
- "Rapid Transit Galop." Barthold Meyer, Comp. Dedicated to Joseph Seligman, President of the Rapid Transit Commissioners. 1875. 5 pp.
- "Brighton Beach Galop." D. L. Herrick, Comp. 1878. 5 pp.

MARCH

- "March." Dedicated to the Directors of the Baltimore & Ohio R. R. C. Meineke, Comp. 1828. 3 pp.
- "The Carrollton March." Performed at the ceremony of the commencing of the Baltimore & Ohio R. R., July 4, 1828. A. Clifton, Comp. Dedicated to the Hon. Charles Carroll. 2 pp.

POLKA

- "Polka." Dedicated to the officers of the Chicago & North-western Railways and the excursionists of the 12th of October, 1859. Delia B. Ward, Comp. 7 pp.
- "Forham Ticket Polka." C. Tradel, Comp. Dedicated to John Adams, 1867. 7 pp.
- "The New Orleans & Great Northern R. R. Polka." Theo. La Hache, Comp. 1854. 6 pp.
- "B. P. & C. Polka." Henry Kleber, Comp. Dedicated to Chas. Ackenheil, Chief Ass't Engr. of the Baltimore, Pittsburgh & Chicago Railroad. 1871.

QUICKSTEP

- "Locomotive Quickstep." L. Thayer Chadwick, Comp. Dedicated to C. C. Dennis.
- "Lion Quick Step." James Hooten, Comp. Dedicated to Capt. Chas. C. Paine of the Rifle Rangers, Boston. Played for the first time at the opening of the railroad to Westborough, Nov. 15, 1834.

SONG

- "Clear the Way." Stephen C. Massett, Comp. Dedicated to the President, Directors and Company of the Great Pacific Rail Road. 1868. 5 pp.
- "The Patent Rail Way Punch Song and Chorus." Henry Angelo and Diethelm, Comps. Dedicated to the car conductors generally. 1874. 6 pp.
- "My Charlie He's a Railroad Boy." Mary, Comp. Dedicated to Arthur Jewett. 1874. 5 pp.
- "Railroad Man." Elmer Schoebel, Sid Erdman and Billy Meyers, Comps. 1923. 5 pp.
- "Our Country's Songs." Pub. by Firth, Pond & Co. 1861. 5 pp.
- "Number Twenty Nine." Will S. Hayes, Comp. Dedicated to Thatcher Perkins, Sup't of Machinery, Louisville & Nashville R. R. 5 pp.

STEAM GALLOP

- Performed by the Steyermaikische Musical Company. Joseph Gungl, Comp. 1835. 3 pp.

WALTZ

- "Pittsburgh Waltz." Pub. by John F. Nunns. 1 pp.
- "Grand Trunk Waltzes." Charles D. Albert, Comp. 10 pp.
- "Waltz." Strauss, Comp. Pub. by Fiot, Meignen & Co. 1 pp.

No doubt there are many items not included in the above list. If any of our members can furnish us with the detailed information, we would be glad to reproduce it in succeeding bulletins.

The History of San Francisco's First Railroad

By GILBERT H. KNEISS

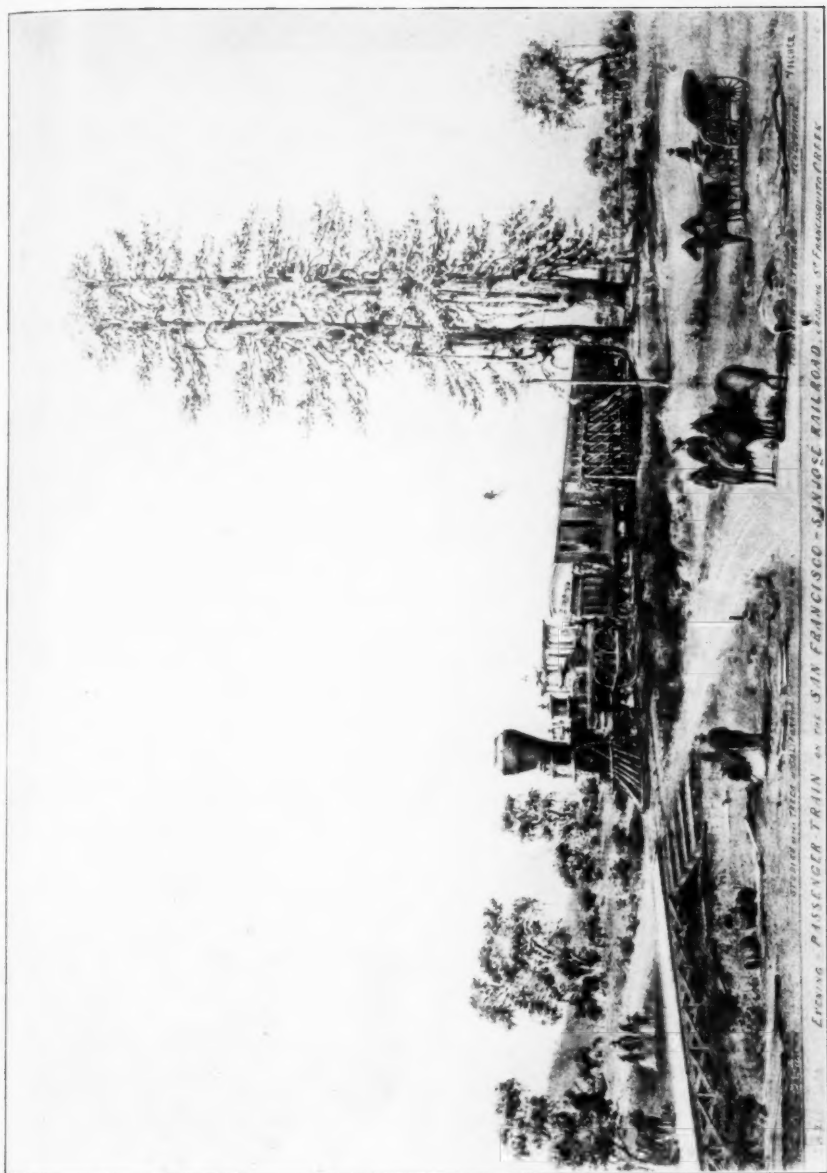
I. THE NEED FOR A RAILROAD

WHEN California was acquired by the United States in 1848 it was wholly without modern transportation facilities. Mule trains were utilized for such freight movements as were undertaken by the Mexicans, while the saddle horse supplied personal transportation. Roads, as we understand the term, were non-existent¹. With the large increase in population following the gold rush of 1849, the need for better facilities began to be apparent. Particularly was improvement needed between San Francisco, the metropolis of the state, and San Jose which had become capital with the convening of the first California Legislature on December 15, 1849².

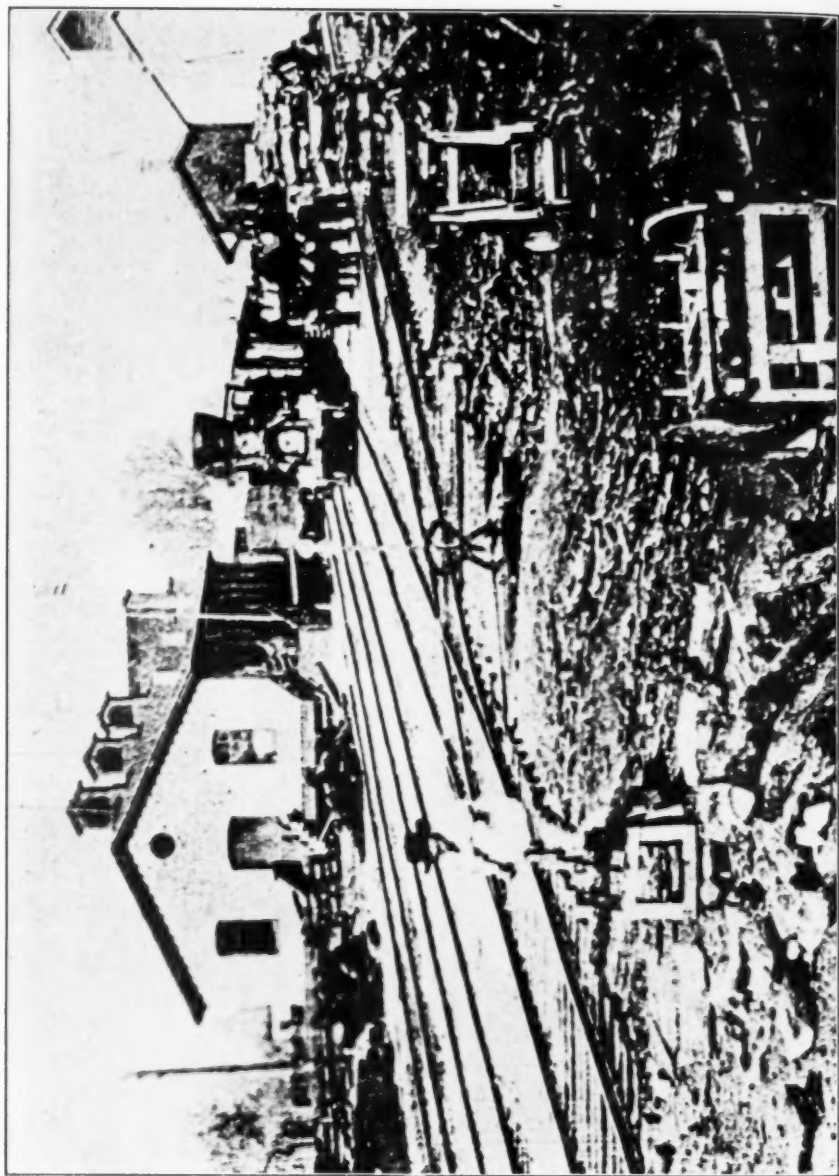
Such roads as existed between the two cities were not worked, and the counties had no funds to make improvements. There were no fences and travellers roamed all around searching for a passable route. A tri-weekly stage service was inaugurated in May, 1850, but the road became so poor the following winter that the stages were withdrawn. Even under the best conditions the trip took nine hours, and the passengers could expect to have to walk part of the way because of the impassable roads. The stage fare from San Francisco to San Jose was \$32. Travellers in their own conveyances often lost the way in fog and darkness and wandered around for hours in circles or resigned themselves to waiting for daylight before continuing their journeys³.

II. INCEPTION OF THE RAILROAD

The project of a railroad connecting San Francisco and San Jose was first discussed in the winter of 1849-50⁴. No action was taken at that time except that an engineer named William J. Lewis made a rough estimate of the cost without personally examining the route⁵. The first formal action was taken when a public railroad meeting was held at San Jose on January 26, 1851 and a resolution passed to open books for stock subscriptions⁶. An address was made by the Reverend B. Brierly which was later printed and distributed to awaken interest in the project⁷. Several subsequent meetings were held in San Jose⁸ and by the end of February, \$100,000 had been subscribed⁹. These subscriptions were found to be ineffective because of defects in the state corporation laws. The passage of the general railroad law of April 28, 1851 remedied this situation, and in conformity with the provisions of the new law, books were again opened for subscription¹⁰. This law was one of the last legislative acts to be passed in San Jose, the capital being removed on May 1, 1851¹¹.



The Evening Passenger Train on the S. F. & S. J. in 1864, passing what is now Palo Alto. Drawn from a photograph. The artist skimped on the number of wheels under the tender and coaches.



The S. F. & S. J. Yards in 1864.

Courtesy S. F. Co.

III. ORGANIZATION OF THE RAILROAD COMPANY

By July 4, 1851¹², \$55,000 had been subscribed of which 10% had been actually paid in¹³. The point of formal organization had been reached, and on September 6, 1851 the "Pacific and Atlantic Rail Road Company" was organized¹⁴ to extend from "some point in the city of San Jose in the county of Santa Clara to some point in the city of San Francisco in the county of San Francisco"¹⁵. The officers of the new company were as follows: Judge Davis Divine, president; James A. Forbes, vice-president; S. J. Hensley, treasurer; C. E. Allen, secretary; and William J. Lewis, engineer. The directors were Judge Davis Divine, E. O. Crosby, W. D. M. Howard, Daniel Murphy, Samuel J. Hensley, James A. Forbes, James C. Cobb, Peter I. Davis, Peter Van Caneghem, Sherman Day, Joseph C. Palmer, and Joseph Aram¹⁶.

Mr. Lewis, the engineer, immediately set to work on his surveys and estimates, the results of which, together with maps, were published on December 26, 1851¹⁷. He had found the proposed route practically level except for the mountains just south of San Francisco where several routes had been examined but only one practical line found—that along the shore line and tide lands¹⁸. The cost of the road was estimated as follows¹⁹:

| | |
|------------------------------|-----------------------|
| Construction | \$1,385,726.17 |
| Buildings and Fixtures | 49,000.00 |
| Running Furniture | 104,400.00 |
| TOTAL COST | \$1,539,126.17 |

Construction of the road presented no great difficulty but financing was another matter. Various expedients were tried by the promoters but without any substantial success. Toward the end of 1851 it was attempted to sell stock on the open market in San Francisco and San Jose but no one subscribed.²⁰ Agents of New York and English banking houses were approached but reported that their principals would not financially interest themselves until some part of the railroad was actually operating and paying dividends²¹. Early in 1852, the Federal Government was asked for aid in the shape of land grants and government bonds²² and this bill actually passed the Senate in May, 1852 but failed in the other house²³.

A new railroad law had been enacted on April 22, 1853, and as the time allowed for starting construction was about to expire²⁴ the company was reorganized on October 29, 1853²⁵. The capital stock was raised from the previous figure of \$1,250,000 to \$2,000,000. A sufficient number of subscriptions were obtained from the former subscribers to satisfy the requirements of the new law, \$55,000 again being pledged. Soon after this reorganization the remaining \$1,945,000 was subscribed in a rather unusual manner. This large block was divided among four parties, Palmer, Cooke & Co., C. K. Garrison, John M. Horner, and E. L. Beard, who subscribed to the stock to enhance the value of certain large

tracts of land near Mission Dolores of which they claimed ownership. No cash was paid to the company on this stock at the time of subscription²⁶. The books were declared closed and in the belief that the railroad would soon be a reality a real estate boom took place in San Jose in November, 1853²⁷.

Prospects now appeared bright. A meeting of stockholders was held January 2, 1854 and the following new officers and directors elected: Joseph C. Palmer, president; Sherman Day, secretary; and William D. M. Howard, George W. Wright, C. K. Garrison, Charles Hopkins, John M. Horner, E. L. Beard, E. O. Crosby, S. J. Hensley, C. T. Ryland, John Yontz, Davis Divine, Peter I. Davis, and Charles R. Bond, directors. The engineer, Mr. Lewis, discovered that the population and business of the country had experienced such a large growth in the three years since his first report that his former estimates were valueless²⁸. Accordingly, the figures were revised and the following estimate made:

| | |
|------------------------------|-----------------------|
| Construction of Road | \$1,384,480.30 |
| Buildings and Fixtures | 100,000.00 |
| Locomotives and Cars | 165,200.00 |
| Right of Way | 50,000.00 |
| Fencing | 45,000.00 |
| TOTAL COST | \$1,744,680.30 |

Two routes were now considered into San Francisco. One crossed the San Bruno ridge at a gap northwest of the Abbey Hotel and entered the valley of Islar's Creek, requiring a grade of 48 feet to the mile and a cut 104½ feet deep at the summit. The other route was almost level, following the shore line according to the former survey³¹. An estimate of the traffic to be obtained was also made. It was found that at that time an average of 150 passengers a day were being carried between San Jose and San Francisco either by direct stage or by steamer from San Francisco to Alviso and thence by connecting stage to San Jose. It was thought that freight would consist principally of agricultural products, meats, livestock, lumber, lime, and quicksilver. In the redwoods above San Francisco Creek were fifteen sawmills capable of cutting 30,000,000 feet annually, but then idle because of the low cost of lumber. It was expected that they would be able to resume operations with the advent of railway transportation³². Following is Lewis' estimate of anticipated receipts, expenses, and profits³³.

ESTIMATED ANNUAL RECEIPTS

| | |
|--|------------------|
| 100,000 through passengers @ \$3 | \$300,000 |
| 50,000 way passengers past San Bruno @ \$2 | 100,000 |
| 150,000 way passengers to San Bruno @ 50c | 75,000 |
| 60,000 tons down freight @ \$4 | 240,000 |
| 15,000 million feet lumber @ \$5 per M | 75,000 |
| Shingles, posts, and rails | 5,000 |
| 20,000 tons up freight @ \$5 | 100,000 |
| GROSS RECEIPTS | \$895,000 |

ESTIMATED CURRENT ANNUAL EXPENSES

| | |
|---------------------------------------|-----------|
| Repairs to Rolling Stock | \$ 60,000 |
| Fuel | 40,000 |
| Oil, etc. | 7,000 |
| Salaries (passenger department) | 40,000 |
| Salaries (freight department) | 40,000 |
| Repairs to Road | 70,000 |
| Salaries of Officers | 40,000 |
| TOTAL CURRENT EXPENSES | \$297,000 |

Balance \$598,000 or over 34% on the estimated cost of the road.

While the first survey was under way, Judge Divine had solicited grants for the right of way and a few deeds had been given at that time³⁴. Further progress was made when Congress on August 4, 1852 passed a law granting the right of way through public lands to all railroads, plank roads, and macadamized turnpikes then chartered or to be chartered within the next ten years³⁵. In addition, the city of San Jose made a gift to the company of St. James Square, a plot 630x550 feet for a station site and the right of way from this square to the city limits was secured³⁶.

The railroad law of April 22, 1853 was now found to contain certain defects that would render it impracticable for any railroad to operate under it. Judge Divine and his attorney, Hugh O'Neal drew up a set of amendments which was passed with some modifications by the Legislature of 1854 and which aided railroad projects throughout the state³⁷.

The beginning of construction was now delayed from an unexpected source. The four large stockholders who had subscribed to all the unissued stock desired to postpone the work until their land titles were confirmed. The other stockholders grew impatient at the delay and at a directors' meeting on June 2, 1854 an installment of 1/2% was ordered paid before July 1st and 2% before August 1st on all stock on which hitherto no cash had been paid, a decision that was aimed directly at the four large stockholders. Palmer, Cooke & Company paid a portion of the first installment and expressed their willingness to pay the remainder as soon as the others did. Mr. Beard had already paid a portion of his 1/2% and paid no more. Garrison and Horner paid nothing. On November 11, 1854 the Board of Directors declared that all stock on which no assessment had been paid was forfeit. By this means, the predominantly large interests of a few stockholders who had contributed little or nothing to the enterprise were disposed of. Palmer, Cooke & Company eventually retained a \$10,000 interest and Garrison \$5,000³⁸.

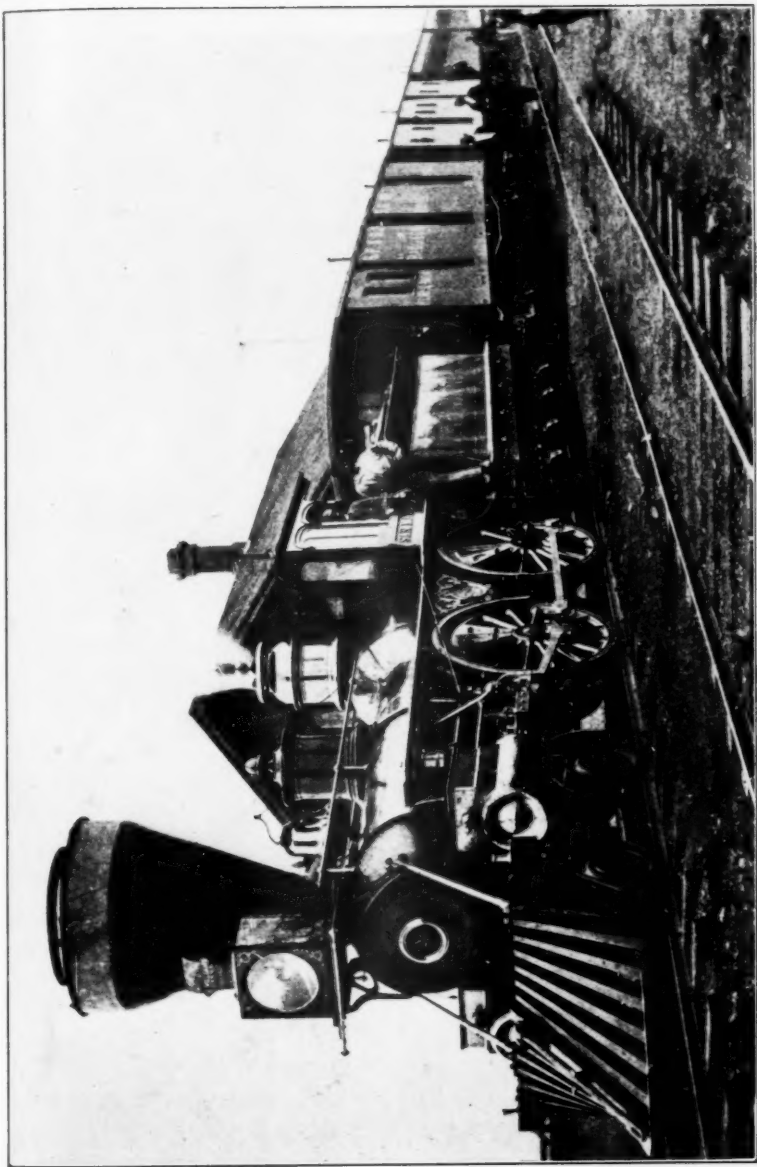
Again the way seemed open for action, but the financial panic of 1855 now prevented the beginning of construction. A word about this panic. The constitution of California prohibited the incorporation of banks and the issuing of paper money. Private establishments in the principal towns were carrying on all of the functions of banks except

for the issuance of bank notes, their largest business being the exchange of coin for the gold dust brought in by the miners. The winter of 1854-55 was very dry and there was insufficient water for working the mines extensively. The miners were short of gold and asked for credit from the merchants who furnished their supplies. The merchants, in turn, were unable to pay for the goods arriving from the East. These goods continued to pour into the already overstocked market and were sold at auction to dispose of them, what gold there was in the state thus going East in payment. The banking houses were drained of their gold and when a run was started on one bank it quickly spread to the others with the result that most of the banks in the state closed their doors³⁹. Public enterprises were suspended and many private projects ruined. The Pacific and Atlantic Rail Road Company found it impracticable to commence construction, and even though the allowable time was extended by the Legislature, the charter was allowed to lapse⁴⁰.

Nothing was then done in the matter for several years. The citizens of San Jose grew impatient and on February 3, 1859 held a large meeting to consider building a railroad from San Jose to Alviso to connect there with the boats for San Francisco⁴¹. This seems to have reawakened interest, and a third company was incorporated in that year. This time the title chosen was a little more modest—"The San Jose and San Francisco Railroad"⁴². Profiting by the experience of the previous companies, it was endeavored at least to commence construction before offering the stock to the public. The Legislature authorized the counties through which the road was to pass (San Mateo County had been formed in 1856⁴³) to vote stock subscriptions to the amount of \$900,000⁴⁴. The press of San Francisco vigorously opposed this subsidy as a fraud against the tax-payers and the directors of the company were so discouraged at the antagonism that they abandoned the effort and dissolved the corporation in June, 1860⁴⁵.

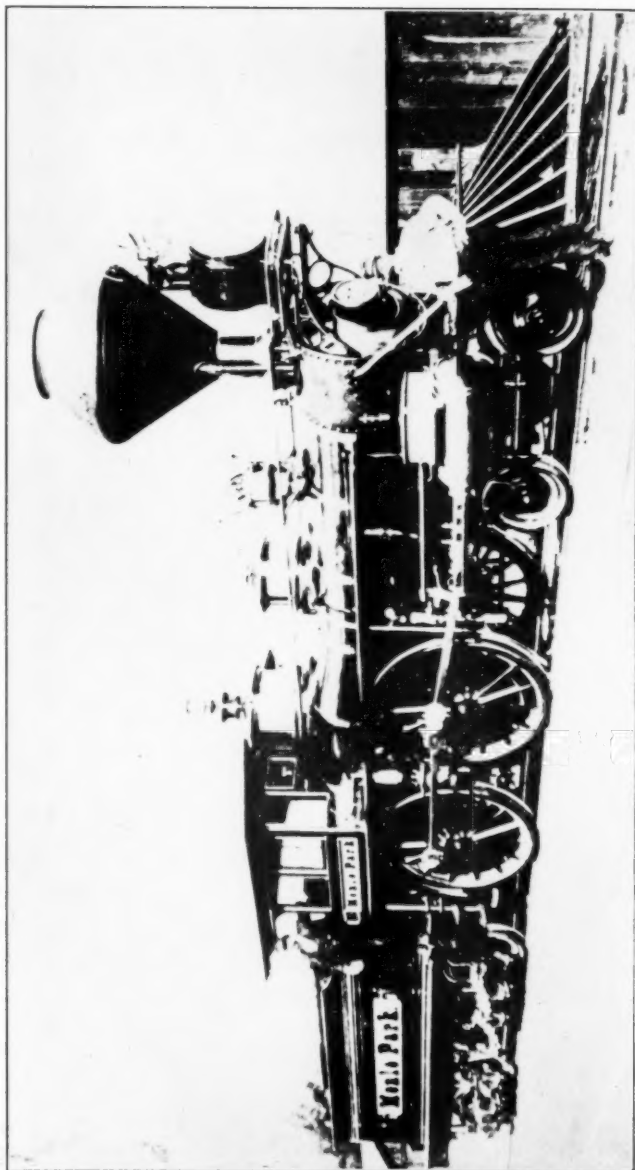
The lapse was a short one for in July, 1860 a fourth company was organized⁴⁶. The officers of this, the final organization were as follows: Timothy Dane, president; Peter Donohue, treasurer; Charles W. Sawyer, secretary; and C. B. Polhemus, H. M. Newhall, M. D. Sweeney, G. H. Bodfish, and B. F. Mann, directors⁴⁷.

It was soon obvious that this fourth company was going to get results. In October, 1860 a contract was let to Charles McLaughlin and Alexander H. Houston to construct and equip the road within the space of three years for the sum of \$2,000,000. \$500,000 was to be paid in cash, \$500,000 in 8% bonds of the company to mature in ten years, \$500,000 in capital stock of the company, and \$500,000 in county bonds⁴⁸. The partial payment in county bonds was made possible by the Legislature again authorizing county aid⁴⁹. San Francisco subscribed \$300,000, Santa Clara County \$200,000, and San Mateo County \$100,000⁵⁰. As the total county subscription was thus \$600,000 instead of \$500,000 the contractors agreed to accept the whole amount of these obligations and reduce the cash payment to \$400,000⁵¹. Sub-



S. F. & S. J. R. R., "San Mateo" and Train in 1866.

Courtesy S. P. Co.



S. F. & S. J. R. R. "Menlo Park." Built by Wm. Mason, 1870.

Courtesy S. P. Co.

scriptions from individuals amounted to \$285,300 of which only about \$100,000 was paid in cash. The directors and contractors absorbed the rest of the stock to keep it off the market⁵².

The act authorizing the county subscriptions did not provide for this stock to be represented at stockholders meetings, the result being that the counties had no word in the management of an enterprise in which they had invested \$600,000. Santa Clara County took alarm at this situation and obtained legislative permission to dispose of its railroad stock in exchange for county bonds or cash. The result was that the railroad company bought back its stock from Santa Clara County using legal tender notes which were quoted at below half face value in California gold. San Mateo County then stole a march on the other counties by getting an act through the Legislature assessing the railroad on a mileage basis. It thus received the largest share of the railroad taxes although it had the least investment. Much high feeling resulted⁵³.

IV. CONSTRUCTION AND OPENING OF THE RAILROAD

The road was not difficult to construct, the principal expense being the entrance to San Francisco through the San Bruno hills where an elevation of 295 feet was reached. There was some apprehension in San Francisco that the company would obtain the right to cross the city to the North Beach district. These fears were groundless as the line entered the city at what was then called Mission Dolores and ran from there to its terminal at Fourth and Townsend Streets.⁵⁵

On October 16, 1863 the San Francisco *Alta California* announced that the next day the partial completion of the railway would be celebrated with an excursion of the officers, directors, and their friends to Redwood City. The cars were to start from the Pioneer Race Course at ten o'clock.⁵⁶ Four hundred excursionists including 175 ladies and the governors of California and Oregon boarded the excursion train which consisted of six passenger cars, three baggage cars, and two freight cars and was drawn by the two locomotives "San Francisco" and "San Jose". The train ran to Mayfield, 35 miles, and then backed up a mile and a half to Menlo Park where the company had provided a picnic of chicken, turkey, ham, beef, champagne, and ice cream and cake in great abundance. "No man thirsted in vain for champagne." Nothing marred the pleasure of the occasion, and on the return trip in the evening the guests followed the custom of the period by electing a president, secretary, and committee to draft resolutions praising the construction of the road, the entertainment, the officers, and the contractors.⁵⁷

The following advertisement appeared in the *Alta California* on October 16, 1863⁵⁸:

On and after Sunday, October 18th, the Cars of the "San Francisco and San Jose Railroad Company" will run as follows:

Start from Pioneer Race Course, opposite the "Willows", at 8½ o'clock, A. M., run by San Miguel, San Bruno, 17 Mile House, San Mateo, Belmont, Redwood City, and Menlo Park, and arrive at Mayfield at 10½ o'clock, A. M. connecting with stages for San Jose.

Returning, leave Mayfield at 10¾ o'clock, A. M., connecting with morning stages from San Jose, and arrive at San Francisco at 12¾ o'clock, P. M.

Stages for Crystal Springs will connect with cars at San Mateo, and for Searsville at Redwood City.

October 16, 1863

A. H. HOUSTON, Gen'l. Sup't.

As stated in the advertisement, regular service started on the 18th. 150 passengers made the trip which was uneventful, except that on the return trip the train ran into a horse⁵⁹. The road was single track of American 50lb. T-rail. Redwood ties from the nearby forests had been used. The construction was good and the trains ran smoothly with little noise at an average speed of twenty miles an hour. The cost had been about \$40,000 per mile. The motive power of the road consisted of three locomotives of 20 to 25 tons which had cost \$15,000 apiece and were capable of pulling six loaded passenger cars over the line. Six passenger cars were owned, seating sixty people each. These were "elegantly finished and supplied with all the modern conveniences for riding in the day time." These had cost \$3500 apiece. About twenty freight cars of various descriptions and valued at \$1200 apiece completed the rolling stock. Two more locomotives were en route from New York and the company was planning to build thirty passenger cars in San Francisco.⁶⁰

Construction continued, and on Saturday, January 16, 1864 the completion to San Jose was celebrated with a formal opening⁶¹. At first it appeared that the festivities would be rather disappointing. It was a drizzly day and a larger crowd than had been expected appeared at the depot for the excursion. Several irate supervisors and others deserted the crowd assembled in the mud and would have nothing more to do with the affair⁶². But the sun finally came out and additional cars were provided, "many citizens enjoying for the first time in their lives the dissipation of riding in cattle cars"⁶³. The long train appeared in San Jose loaded with excursionists⁶⁴ and was greeted with a salute of thirteen guns and the militia and firemen of the surrounding villages in full uniform. Speeches were made, followed by music, maneuvers of the militia and firemen, and finally a cold collation. The weary excursionists returned to San Francisco in the cool of the evening⁶⁵.

The road was well patronized from the beginning, being characterized as one of the most successful enterprises ever undertaken in the state⁶⁶. Freight was not carried until February, 1864 and separate freight trains began the following June⁶⁷. The company did not expect to obtain much local freight as a large portion of the produce of San Mateo County was within reach of the navigable waters of the Bay and found cheap but slow transportation by sloop⁶⁸. But passenger receipts averaged about \$200 a day from the beginning⁶⁹. San Jose was now three and a half hours away as against eight by stage and the fare was

reduced from the \$32 of 1850 to \$2.50.⁷⁰ By March 13, 1866 the road was extended to Gilroy⁷¹, the total cost from San Francisco to Gilroy being about \$2,500,000.⁷² In 1866 the total receipts from freight carried were \$61,388.68 while in 1867 the figure jumped to \$119,693.48⁷³.

V. TRANSCONTINENTAL HOPES

From the earliest inception of the railroad project it had been hoped that it would form the initial link of a transcontinental system⁷⁴. This was indicated by the name chosen for the first corporation—"Pacific and Atlantic Rail Road." But if it was impossible to finance the fifty miles between San Francisco and San Jose, anything further was out of the question. However, with the passage by Congress of the Pacific Railway Act of July 1, 1862 it seemed that the road's transcontinental hopes might be realized. This act assigned to the Central Pacific the right to build a railroad from a point near San Francisco to a junction with the Union Pacific, "Central Pacific" in the act being construed to include also its associates, successors, and assigns⁷⁵. There had been an understanding between Judah, the Central Pacific promoter and the San Francisco and San Jose Railroad that the latter would be assigned the rights between San Francisco and Sacramento⁷⁶. This would have meant a government subsidy of \$16,000 per mile⁷⁷. As late as October, 1863 it was believed that the transcontinental line would enter San Francisco via the Western Pacific from Sacramento to San Jose and thence over the San Francisco and San Jose line⁷⁸. For some reason that is at present obscure, this expectation was disappointed and the entrance was made through Oakland instead⁷⁹.

VI. SALE TO THE SOUTHERN PACIFIC

On December 2, 1865, the Southern Pacific Railroad was incorporated by San Francisco capitalists to build south to San Diego and thence east to the state boundary⁸⁰. In 1868 the city of San Francisco made the new company a gift of the 3000 shares of San Francisco and San Jose Railroad stock which it had acquired under the act of 1861 on condition that the latter road be purchased and made a part of the line to the southeastern boundary of the state⁸¹. At just about this time the Southern Pacific came under the control of the Central Pacific⁸² and on October 12, 1870 the San Francisco and San Jose, the Santa Clara and Pajaro Valley (the Gilroy extension), the California Southern (a project on paper only) were consolidated with the Southern Pacific⁸³. Thus ended the independent existence of the San Jose line.

In conclusion it may be mentioned that what was the San Francisco and San Jose Railroad is still the only line into San Francisco and that time saw its hopes of being a link in the transcontinental system realized beyond its expectations. The only major change that has been made since its completion (other than double tracking, etc.) is that the entrance to San Francisco through the San Bruno hills has been abandoned in favor of the first route decided upon by Lewis in 1851, that along the shore line of San Francisco Bay⁸⁴.

NOTES

- ¹Hunt and Sanchez, *History of California*, 493.
 - ²Encyclopaedia Britannica, 14th ed., XIX, 948.
 - ³Hall, *History of San Jose*, 236.
 - ⁴Bancroft, *History of California*, VII, 536.
 - Articles of association*, 3.
 - ⁵*Articles of association*, 3.
 - ⁶Hall, *History of San Jose*, 238.
 - ⁷*Articles of association*, 3.
 - ⁸Hall, *History of San Jose*, 238.
 - ⁹Bancroft, *History of California*, VII, 536.
 - ¹⁰*Articles of association*, 3.
 - ¹¹Encyclopaedia Britannica, 14th ed., XIX, 948.
 - ¹²Hall, *History of San Jose*, 238.
 - ¹³*Articles of association*, 3.
 - ¹⁴Eldredge, *History of California*, IV, 273.
 - Bancroft, *History of California*, VII, 536.
 - Articles of Association*, 3.
 - ¹⁵*Articles of association*, 33.
 - ¹⁶*Articles of association*, 3.
 - ¹⁷Hall, *History of San Jose*, 238.
 - ¹⁸*Articles of association*, 4.
 - ¹⁹Hall, *History of San Jose*, 238.
 - ²⁰Bancroft, *History of California*, 536.
 - ²¹*Articles of association*, 4.
 - ²²Bancroft, *History of California*, VII, 536.
 - Articles of association*, 4.
 - ²³Bancroft, *Chronicles*, VI, 137.
 - ²⁴*Articles of association*, 4.
 - ²⁵Bancroft, *History of California*, 536.
 - ²⁶*Articles of association*, 4.
 - ²⁷Hall, *History of San Jose*, 261.
 - ²⁸*Articles of association*, 5.
 - ²⁹*Articles of association*, 44.
 - ³⁰Lewis, *Report of chief engineer*, 15.
 - ³¹*Articles of association*, 44.
 - ³²Lewis, *Report of chief engineer*, 17.
 - ³³*Articles of association*, 58.
 - ³⁴*Articles of association*, 4.
 - ³⁵*Articles of association*, 30.
 - ³⁶*Articles of association*, 47.
 - ³⁷*Articles of association*, 5.
 - ³⁸*Articles of association*, 6.
 - ³⁹Tuthill, *History of California*, 402.
 - ⁴⁰Bancroft, *Chronicles*, VI, 138.
 - ⁴¹Hall, *History of San Jose*, 277.
 - ⁴²Bancroft, *History of California*, VII, 537.
 - ⁴³Coy, *Guide to county archives*, 409.
 - ⁴⁴Bancroft, *Chronicles*, VI, 139.
 - ⁴⁵Bancroft, *History of California*, VII, 537.
 - ⁴⁶Bancroft, *History of California*, VII, 537.
 - ⁴⁷Bancroft, *Chronicles*, VI, 139.
 - ⁴⁸Bancroft, *History of California*, VII, 537.
 - ⁴⁹*San Francisco and San Jose Railroad act*, 1.
 - ⁵⁰Daggett, *History of the Southern Pacific*, 120.
 - ⁵¹*San Francisco Evening Bulletin*, Jan. 18, 1863, 3.
 - ⁵²Bancroft, *History of California*, VII, 537.
 - ⁵³Bancroft, *Chronicles*, VI, 141.
 - ⁵⁴Bancroft, *Chronicles*, VI, 139.
- San Francisco Daily Alta California, Oct. 18, 1863, 1.

- 55Bancroft, *Chronicles*, VI, 140.
- 56San Francisco *Daily Alta California*, Oct. 16, 1863, 1.
- 57San Francisco *Daily Alta California*, Oct. 18, 1863, 1.
- 58San Francisco *Daily Alta California*, Oct. 16, 1863, 2.
- 59San Francisco *Daily Alta California*, Oct. 19, 1863, 1.
- 60San Francisco *Daily Alta California*, Oct. 18, 1863, 1.
- 61Bancroft, *Chronicles*, VI, 140.
- 62San Francisco *Evening Bulletin*, Jan. 16, 1864, 3.
- 63San Francisco *Evening Bulletin*, Jan. 18, 1864, 3.
- 64Hall, *History of San Jose*, 290.
- 65San Francisco *Evening Bulletin*, Jan. 18, 1864, 3.
- 66Hall, *History of San Jose*, 312.
- 67Bancroft, *Chronicles*, VI, 140.
- 68San Francisco *Daily Alta California*, Oct. 18, 1863, 1.
- 69Hall, *History of San Jose*, 312.
- 70San Francisco *Daily Alta California*, Oct. 18, 1863, 1.
- 71Hall, *History of San Jose*, 311.
- 72Hall, *History of San Jose*, 312.
- 73Hall, *History of San Jose*, 312.
- 74Eldredge, *History of California*, IV, 273.
- 75San Francisco *Evening Bulletin*, Jan. 18, 1864, 3.
- 76Daggett, *History of the Southern Pacific*, 48.
- Bancroft, *Chronicles*, VI, 140.
- 77San Francisco *Evening Bulletin*, Jan. 18, 1864, 3.
- 78San Francisco *Daily Alta California*, Oct. 18, 1863, 1.
- 79Daggett, *History of the Southern Pacific*, 120.
- 80Daggett, *History of the Southern Pacific*, 120.
- 81Bancroft, *History of California*, VII, 598.
- 82Daggett, *History of the Southern Pacific*, 122.
- 83Daggett, *History of the Southern Pacific*, 123.
- 84Articles of association, 4.

BIBLIOGRAPHY

- Articles of association and by-laws of the Pacific and Atlantic rail road company with the reports of the chief engineer and secretary*, Whitton, Towne & Co., San Francisco, 1854.
- Bancroft, Hubert Howe, *Chronicles of the builders of the commonwealth*, VI, History Company, San Francisco, 1892.
- Bancroft, Hubert Howe, *History of California*, VII, History Company, San Francisco, 1890.
- Coy, Owen C——, *Guide to the county archives of California*, California State Printing Office, Sacramento, 1919.
- Daggett, Stuart, *Chapters on the history of the Southern Pacific*, Ronald Press, New York, 1922.
- Eldredge, Zoeth Skinner, *History of California*, IV, Century History Company, New York, 1915.
- "Formal opening of a railway", *Daily Alta California*, XV, 4979, San Francisco, 1863.
- Hall, Frederic, *The history of San Jose and surroundings with biographical sketches of early settlers*, A. L. Bancroft and Company, San Francisco, 1871.
- Hunt, Rockwell Dennis and Sanchez, Nellie Van de Grift, *A short history of California*, Thomas Y. Crowell, New York, 1929.
- Lewis, William J——, *Report of the chief engineer of the Pacific and Atlantic rail road company*, Whitton, Towne and Company, San Francisco, 1855.
- "San Jose", *Encyclopaedia Britannica*, 14th ed., XIX, 948, Encyclopaedia Britannica, Inc., New York, 1929.
- The San Francisco and San Jose railroad act*, Evening Mirror Press, San Francisco, 1861.
- Tuthill, Franklin, *History of California*, H. H. Bancroft and Company, San Francisco, 1866.

Locomotives of the Boston & Maine Railroad

By CHAS. E. FISHER

CONCORD & MONTREAL RAILROAD



THE Concord & Montreal R. R. was formed on December 31, 1889 by a consolidation of the Concord R. R. and the Boston, Concord & Montreal R. R. The Concord R. R., the older of the two roads, was chartered in the State of New Hampshire on June 27th, 1835, to build a railroad from Nashua to Concord, N. H., a distance of 35 miles. The Concord R. R. was locally owned, the State of New Hampshire also being financially interested, and the road for years was one of the wealthiest, if not the wealthiest railroad in the State of New Hampshire.

The early reports of the Concord R. R. are of interest as they contain much relative to their locomotives. The road was opened for traffic on September 1, 1842, but the first roster of locomotives does not appear until the report of 1850 as follows:

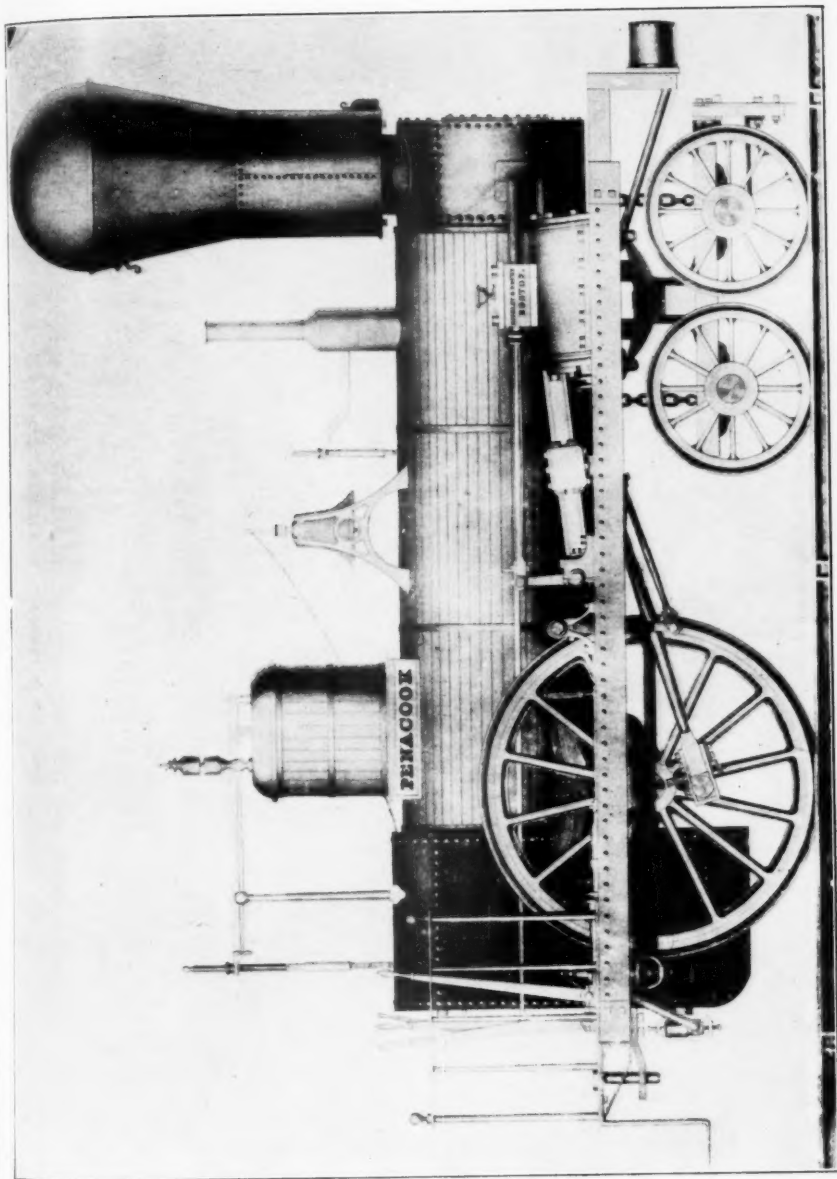
| Passenger Engines | | | | |
|-------------------|-----------------|-------|-----|----------|
| Gen'l. Stark | Amoskeag | 1849. | 66" | 23½ tons |
| Nashua | Hinkley & Drury | 1847 | 66" | 20 " |
| Tahanto | " | 1848 | 66" | 20 " |
| Rumford | " | 1848 | 66" | 20 " |
| Passaconway | " | 1848 | 66" | 20 " |
| Hooksett | " | 1842 | 54" | 12 " |
| Freight Engines | | | | |
| Merrimac | Hinkley & Drury | 1847 | 54" | 30 " |
| Manchester | " | 1848 | 54" | 30 " |
| Suncook | " | 1845 | 54" | 14 " |
| Small Engines | | | | |
| Amoskeag | Hinkley & Drury | 1842 | 60" | 10½ " |
| Souhegan | " | 1842 | 54" | 10½ " |

The report states that all of the passenger engines are inside connected, the freight engines are outside connected. The report makes mention of two engines having been sold that year. These were:

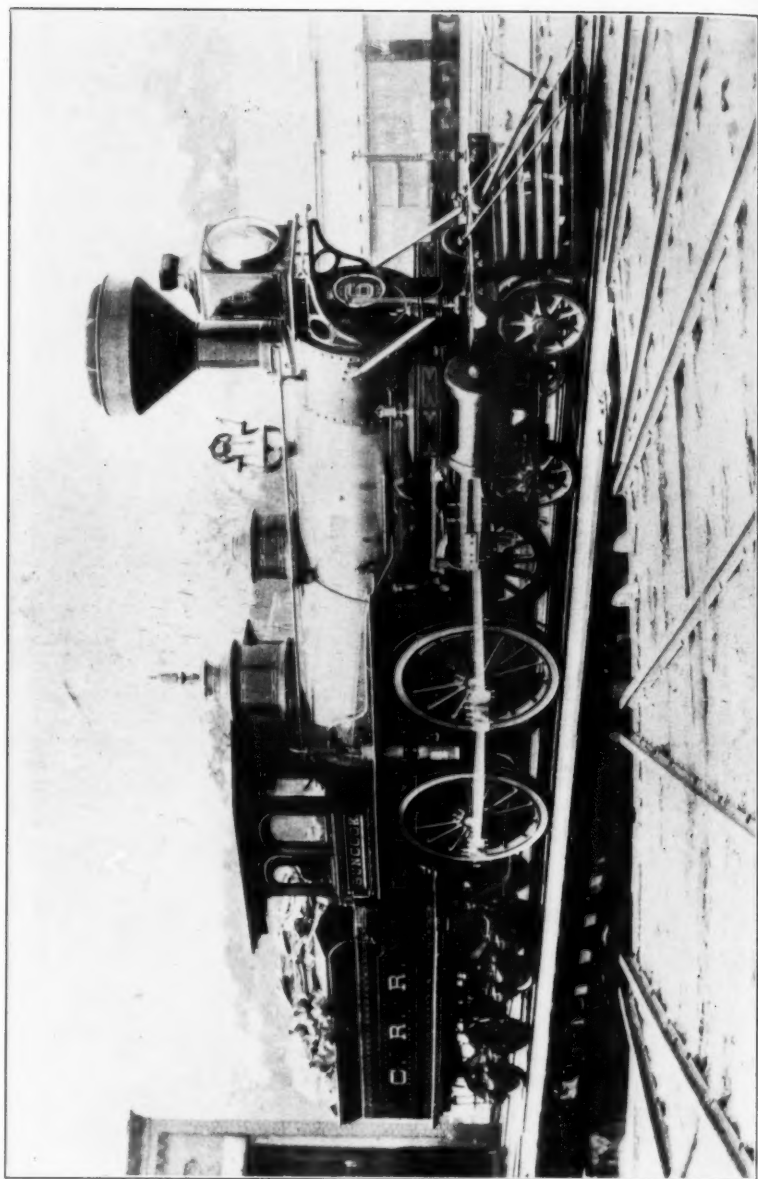
| | | | | |
|-------------|-----------------|------|-----|--------------------|
| Pennacook | Hinkley & Drury | 1842 | 60" | Sold for \$5000.00 |
| Piscataquog | " | 1842 | 60" | Sold for \$3500.00 |

Both were single driving wheel engines. The "Hooksett", "Amoskeag" and "Souhegan" also had only one pair of drivers, but, according to the above report, the "Hooksett" had been rebuilt to a 4-4-0 prior to 1850.

On Nov. 1, 1850, the Concord R. R. leased the Manchester & Lawrence R. R., which ran between those two cities. The Manchester & Lawrence R. R. continued to publish separate reports and, turning to



Concord R. R. "Penacook". Hinkley & Drury, 1842.



Concord R. R. "Suncock." Concord R. R. 1880.

these we find an inventory dated April 30, 1851 and a valuation report dated Nov. 29, 1856. The construction dates are not given, but they have been added from my own records and for brevity will be given in one roster:

| | | | | | | |
|---------------|-----------------|------|-----|-----|------|------------------------------------|
| Londonderry | Ampskeag | 1850 | 66" | 23½ | tons | \$3000.00 |
| Washington | Ampskeag | 1849 | 60" | 23½ | tons | 4800.00 |
| Rob Roy | Amoskeag | 1850 | 60" | 23½ | tons | 6000.00 |
| Lion | Hinkley & Drury | 1844 | 54" | 14 | tons | Sold |
| Titan | Taunton L. W. | 1851 | 54" | 23½ | tons | 5500.00 |
| Rockingham | Taunton L. W. | 1852 | 54" | 25 | tons | 6000.00 |
| John Souther | John Souther | 1854 | 60" | 23½ | tons | 6000.00 |
| Gov. Weare | John Souther | 1854 | 54" | 25 | tons | 1500.00 |
| James Madison | Amoskeag | 1855 | 54" | 27 | tons | 8000.00 |
| James Hayward | Amoskeag | 1856 | 60" | 27 | tons | Had not arrived at date of report. |

All locomotives are given as having four drivers. The "Londonderry" subsequently carried the names "London" and "Lawrence". The "Rob Roy" was renamed "David A. Bunton" and carried that name on the Concord R. R. According to the increased valuation, it must have been extensively rebuilt prior to 1856. The "Lion" was purchased from the Nashua & Lowell R. R. and was turned over to John Souther in part payment of the two new engines from that builder. The "Gov. Weare" exploded at Lawrence, Mass. on Nov. 6, 1856. This accounts for the low valuation. We have every reason to believe that since John Souther had closed his works in Boston and gone to Richmond, Va., that this engine was rebuilt at the Hinkley Works and was renamed "Uriel G. Crocker." What the ultimate fate of these engines was, we are not certain. We suspect the "John Souther," after the experience with the "Gov. Weare" was one of the engines sold to the United States Military R. R. We do know that the "Londonderry," "Titan," "Rockingham," "James Madison" and "James Hayward" carried Concord R. R. numbers as will be shown in a subsequent list.

In the reports of the Concord R. R. dated March 31st, 1858 and 1859, we find a joint report of the locomotives of the Concord and Manchester & Lawrence Railroads. The numbering of these locomotives is entirely different from the numbering which appeared on the Concord R. R. at a subsequent date. These engines may have carried these numbers or they may simply indicate the line number in this report. There is no doubt that there was a renumbering of engines on the Concord R. R., but at this late date it is almost impossible to follow it through. The numbering of the locomotives on this report may have been one of the earlier series of numbers. It may not have been, we are not certain.

| | | | | | | | | |
|------------------|---------------|------|--------|-----|-----|------|-------|-----------------|
| 1 Nashua | Boston L. W. | 1847 | 15x18" | 66" | 24½ | tons | I. C. | |
| 2 Tahanto | Boston L. W. | 1855 | 16x18" | 66" | 25 | tons | I. C. | Rebuilt in 1855 |
| 3 N. G. Upham | Boston L. W. | 1855 | 15x18" | 66" | 24½ | tons | I. C. | Rebuilt in 1855 |
| 4 I. Spaulding | Amoskeag | 1854 | 16x20" | 66" | 26 | tons | I. C. | |
| 5 J. Kimball | Amoskeag | 1856 | 15x22" | 66" | 25 | tons | O. C. | |
| 6 Merrimack | Boston L. W. | 1847 | 15x20" | 54" | 23 | tons | O. C. | |
| 7 Manchester | Boston L. W. | 1848 | 15x20" | 54" | 24½ | tons | O. C. | |
| 8 Concord | Amoskeag | 1852 | 16x20" | 60" | 24 | tons | I. C. | |
| 9 Ixion | Amoskeag | 1853 | 15x24" | 60" | 26 | tons | O. C. | |
| 10 Thornton | Amoskeag | 1853 | 15x24" | 60" | 26 | tons | O. C. | |
| 11 Blodgett | Amoskeag | 1854 | 15x24" | 60" | 26 | tons | O. C. | |
| 12 Londonderry | Amoskeag | 1850 | 16x18" | 66" | 24 | tons | I. C. | |
| 13 Washington | Amoskeag | 1849 | 16x18" | 60" | 24 | tons | I. C. | |
| 14 D. A. Buntion | Amoskeag | 1850 | 16x18" | 66" | 24 | tons | I. C. | |
| 15 Titan | Taunton L. W. | 1851 | 16x20" | 54" | 25 | tons | I. C. | |
| 16 Rockingham | Taunton L. W. | 1852 | 16x20" | 54" | 25 | tons | I. C. | |
| 17 John Souther | Globe L. W. | 1854 | 15x20" | 66" | 24½ | tons | I. C. | |
| 18 James Madison | Amoskeag | 1855 | 16x24" | 60" | 26 | tons | O. C. | |
| 19 E. J. M. Hale | Amoskeag | 1856 | 16x22" | 66" | 26 | tons | O. C. | |
| 20 James Hayward | Amoskeag | 1856 | 16x22" | 66" | 26 | tons | O. C. | |
| 21 J. Stickney | Amoskeag | 1855 | 16x24" | 66" | 28 | tons | O. C. | |

Although the "J. Stickney" does not appear until the report of 1859, this engine, like the "J. Kimball," "James Madison," E. J. M. Hale," and "James Hayward," were undoubtedly five of the fourteen engines known to have been constructed by the Amoskeag Works before they finally stopped construction of locomotives which do not appear on the Amoskeag records.

The reports of the Concord & Portsmouth R. R. indicate they owned the following locomotives:

| | | | |
|------------|-----------------|------|------------|
| Concord | Hinkley & Drury | — | 12x18" |
| Epping | Globe | — | 16x20" |
| Greenland | Taunton L. W. | 1853 | 14x20" 60" |
| Portsmouth | Taunton L. W. | 1852 | 14x20" 60" |

The construction dates are not given in their reports. The dates of the Taunton engines are taken from the Taunton records. The "Concord" must have been purchased second-hand as this engine is not listed in the Hinkley records. The "Portsmouth" was renamed "Gov. Gilmore" on the Concord R. R.

Subsequent reports of the Concord R. R. yield but little in the matter of their locomotives. The report of 1861 states that the locomotive "Amherst," for running the light train, has just been completed. No record of this locomotive can be found on any subsequent roster. It may have been renamed or sold and is mentioned here for what it is worth.

The report of 1863 states that four locomotives were sold to the United States Government. We know that three of these were the "Thornton," "E. J. M. Hale" and "Epping." What the fourth one was, we do not know, but from its construction, we suspect it was the "John Souther."

Turning now to Mr. Yeaton's list, through the kindness of Mr. J. Frank Cook, retired Concord R. R. engineer; Charles Edward Caswell of Concord, N. H., our own member, G. F. Starbuck and the American Locomotive Co., I believe the following roster of Concord R. R. locomotives is as accurate as can be presented at this late day, in spite of the many rebuildings and alterations to the motive power. Mr. Cook, from his actual running of many of these engines, has been especially helpful and another of our members, Mr. H. C. Fall, has been helpful in placing some of these engines numerically.

For the benefit of our members, when the two roads were consolidated into the Concord & Montreal R. R., the Concord R. R. engines retained their own numbers. For this reason the Concord & Montreal number will be omitted. It is understood, however, that engines received between 1889 and 1895, the date of the lease to the Boston & Maine R. R., carried only Concord & Montreal numbers. Replacements will be indicated in their proper places, but other than this the Concord & Montreal number is the same as the Concord R. R. number.

| | | | | | | |
|------------------|-----------------|--------|-----------|-------|-----------------------------|------------------------|
| Pennacook | Hinkley & Drury | # 4 | 5-19-42 | 4-2-0 | 10½x20" | Sold—1850 |
| Amoskeag | Hinkley & Drury | # 8 | 9- 18-42 | 4-2-0 | 10½x20" | Sold—1854 |
| Souhegan | Hinkley & Drury | # 9 | 9-22-42 | 4-2-0 | 10½x20" | Sold to C&St.LRR |
| Piscataquog | Hinkley & Drury | # 19 | 7- 9-43 | 4-2-0 | 10½x20" | Sold—1850 |
| Rumford | Hinkley & Drury | # 183 | 7- 7-48 | 4-4-0 | 15x18" | Sold to B&LRR |
| Gen'l. Stark | Amoskeag | # 2 | 6- 18-49 | 4-4-0 | 16x18" | Disappears before 1856 |
| Washington | Amoskeag | # 3 | 12- 18-49 | 4-4-0 | 16x18" | Disappears after 1859 |
| Pennacook | Amoskeag | — | 1852 | 4-4-0 | ? | Disappears before 1857 |
| Thornton | Amoskeag | # 110 | 8-30-53 | 4-4-0 | 15x24" | Sold—USMRR |
| John Souther | Globe | — | 1854 | 4-4-0 | 15x20" | Disappears after 1859 |
| Rob Roy | Amoskeag | # 4 | 6- 18-50 | 4-4-0 | 16x18" | Rebuilt & renamed |
| D. A. Bunton | — | — | 1855 | 4-4-0 | 16x18" | Disappears after 1859 |
| E. J. M. Hale | Amoskeag | — | 1856 | 4-4-0 | 16x22" | Sold—USMRR |
| Merrimack | Hinkley & Drury | # 67 | 1- 9-47 | 4-4-0 | 15x20" | Sold—OCRR |
| Gov. Straw | Concord R. R. | — | 1870 | 4-4-0 | 16x24" | — |
| 701 | — | — | — | 4-4-0 | Scrap—B&M 1898 | — |
| 701 | Manchester | — | 1899 | 4-6-0 | 19x26" | Re 2014 |
| 2 Nashua | Hinkley & Drury | # 122 | 9-18-47 | 4-4-0 | 15x18" | Scrap—CRR |
| 2 Pennichuck | Concord R. R. | — | 1885 | 4-4-0 | 17x24" | — |
| 702 | — | — | — | 4-4-0 | Renumbered 612 | — |
| 3 Manchester | Hinkley & Drury | # 160 | 3-30-48 | 4-4-0 | 15x20" | Scrap—CRR |
| 3 Manchester | Manchester | # 761 | 1879 | 4-4-0 | 16x24" | — |
| 703 | — | — | — | 4-4-0 | Scrap—B&M 1902 | — |
| 703 | Baldwin | #21716 | 1903 | 4-4-0 | 18x24" | Re 966 |
| 4 Passaconway | Hinkley & Drury | # 207 | 11- 7-48 | 4-4-0 | 15x18" | Rebuilt & renamed |
| N. G. Upham | Concord R. R. | — | 1855 | 4-4-0 | 15x18" | Scrap—CRR |
| 4 Nestor | Manchester | #1369 | 1887 | 0-4-0 | 16x22" | — |
| 704 | — | — | — | 0-4-0 | Renumbered 62 | — |
| 5 Gov. Weare | John Souther | — | 1854 | 4-4-0 | Exploded—rebuilt & renamed. | — |
| Uriel G. Crocker | Hinkley & Drury | — | — | 4-4-0 | Scrap—CRR | — |
| 5 Merrimac | Mason | # 494 | 5- 1-73 | 4-4-0 | 15x22" | See Note |
| 705 | — | — | — | 4-4-0 | Scrap—B&M 1897 | — |
| 705 | Schenectady | #4711 | 1898 | 4-6-0 | 21 & 32x26" | Re 2032 |
| 6 Tahanto | Hinkley & Drury | # 142 | 1-10-48 | 4-4-0 | 15x18" | Rebuilt |
| — | Concord R. R. | — | 1855 | 4-4-0 | 15x18" | Scrap—CRR |
| 6 Suncook | Concord R. R. | — | 1880 | 4-4-0 | ? | — |
| 706 | — | — | — | 4-4-0 | Scrap—B&M 1905 | — |
| 706 | Manchester | — | 1906 | 2-6-0 | 19x26" | Re 1426 |

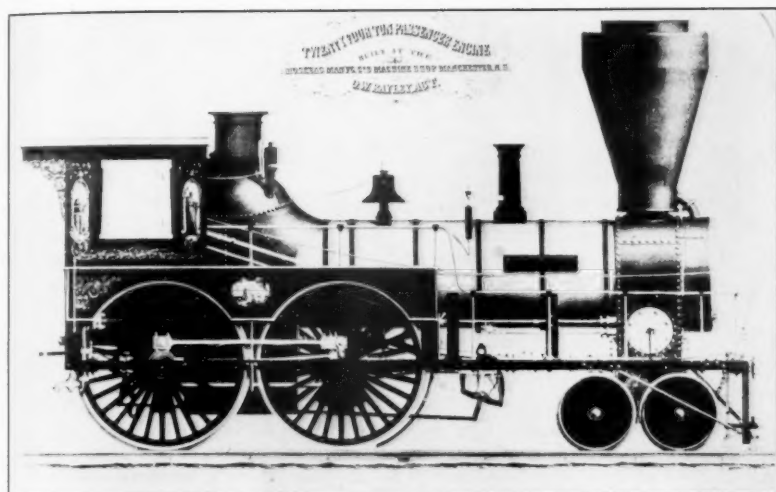
| | | | | | | | |
|-----|-------------------|-----------------|-------|----------|-------|------------------------------------|----------------------|
| 7 | Titan | Taunton | # 63 | 1-13-51 | 4-4-0 | 16x20" | —Scrap CRR |
| 7 | Titan | Manchester | #1243 | 1885 | 0-4-0 | 16x22" | |
| 707 | | | | | 0-4-0 | Renumbered 63 | |
| 8 | Londonderry | Amoskeag | # 5 | 5- 1-50 | 4-4-0 | 16x18" | Rebuilt and renamed |
| | London | Concord R. R. | | | 4-4-0 | Rebuilt and renamed | |
| | Lawrence | Concord R. R. | | | 4-4-0 | Scrap—CRR | |
| 8 | Tiger | Manchester | #1333 | 1887 | 0-4-0 | 16x22" | |
| 708 | | | | | 0-4-0 | Scrap—B&M 1909 | |
| 708 | | Manchester | — | 1910 | 0-6-0 | 19x24" Re 297 | |
| 9 | Suncook | Hinkley & Drury | 43 | 5-23-45 | 4-4-0 | 13½x20" | —Scrap CRR |
| 9 | Gov. Weston | Concord R. R. | | 1873 | 4-4-0 | 16x24" | |
| 709 | | | | | 4-4-0 | Scrap—B&M 1908 | |
| 709 | | Schenectady | — | 1909 | 2-6-0 | Re 1473 | |
| 10 | Hooksett | Hinkley & Drury | # 5 | 6-27-42 | 4-2-0 | 10½x20" | Rebuilt |
| | | Concord R. R. | | | 4-4-0 | Sold—BH&ERR | |
| | | Concord R. R. | | 1873 | 4-4-0 | 16x24" | |
| 10 | Anson S. Marshall | | | | 4-4-0 | Scrap—B&M 1908 | |
| 710 | | Manchester | — | 1909 | 4-4-0 | 18x24" Re 1003 | |
| 710 | | Amoskeag | # 20 | 1-19-52 | 4-4-0 | 16x20" | —Scrap CRR |
| 11 | Concord | Concord R. R. | | 1881 | 4-4-0 | ? | |
| 11 | Passaconway | | | | 4-4-0 | Scrap—B&M 1905 | |
| 711 | | Amoskeag | # 167 | 7- 7-54 | 4-4-0 | 15x24" | —Scrap CRR |
| 12 | Blodgett | Manchester | # 720 | 1873 | 4-4-0 | 16x24" | |
| 12 | John E. Lyon | | | | 4-4-0 | Scrap—B&M 1897 | |
| 712 | | Schenectady | #4712 | 1898 | 4-6-0 | 21 & 32x26" Re 2033 | |
| 712 | | Amoskeag | # 168 | 6-12-54 | 4-4-0 | 16x20" | —Scrap C&M |
| 13 | Isaac Spaulding | Manchester | #1481 | 1890 | 0-6-0 | 17x24" | |
| 13 | Camel | | | | 0-6-0 | Renumbered 112 | |
| 713 | | Taunton | # 130 | 3- 7-53 | 4-4-0 | 14x20" | —Scrap CRR |
| 14 | Greenland | Concord R. R. | | 1883 | 4-4-0 | 17x24" | |
| 14 | Concord | | | | 4-4-0 | Scrap—B&M 1908 | |
| 714 | | Manchester | — | 1909 | 4-4-0 | 18x24" Re 1004 | |
| 714 | | Taunton | # 118 | 10-22-52 | 4-4-0 | 16x20" | —Scrap CRR |
| 15 | Rockingham | Concord R. R. | | 1884 | 4-4-0 | 18x22" | |
| 15 | Massabesic | | | | 4-4-0 | Scrap—B&M 1909 | |
| 715 | | Manchester | — | 1910 | 0-6-0 | 19x24" Re 298 | |
| 16 | Ixion | Amoskeag | # 93 | 4-26-53 | 4-4-0 | 15x24" | —Scrap CRR |
| 16 | John H. Pierson | Manchester | #1397 | 1889 | 4-6-0 | 18x24" | —Renamed |
| 716 | Waukewan | | | | 4-6-0 | Renumbered 1941 | |
| 17 | James Madison | Amoskeag | — | 1855 | 4-4-0 | 16x24" | —Rebuilt and renamed |
| | Chas. L. Eastman | Concord R. R. | | | 4-4-0 | Scrap—CRR | |
| 17 | Hooksett | Concord R. R. | | 1875 | 4-4-0 | 16x24" | —Rebuilt |
| | | Concord Shops | | 1892 | 4-4-0 | 16x24" | |
| 717 | | | | | 4-4-0 | Scrap—B&M 1906 | |
| 717 | | Schenectady | — | 1907 | 2-8-0 | 20x30" Re 2399 | |
| 18 | Josiah Stickney | Amoskeag | — | 1855 | 4-4-0 | 16x24" | —Scrap CRR |
| 18 | Gen. John Stark | Concord R. R. | | 1878 | 4-4-0 | 16x24" | |
| 718 | | | | | 4-4-0 | Scrap—B&M 1905 | |
| 718 | | Manchester | — | 1906 | 0-6-0 | 19x24" Re 246 | |
| 19 | James Hayward | Amoskeag | — | 1856 | 4-4-0 | 16x22" | —Scrap CRR |
| 19 | J. W. Hildreth | Concord R. R. | | 1873 | 4-4-0 | Transferred to B&M; Renumbered 246 | |
| 19 | Monarch | Manchester | #1332 | 1887 | 4-6-0 | 19x24" | |
| 719 | | | | | 4-6-0 | Renumbered 1940 | |
| 20 | Union | Concord R. R. | | 1863 | 4-4-0 | ? Scrap CRR | |
| 20 | Triton | Manchester | #1429 | 1889 | 0-4-0 | 16x22" | |
| 720 | | | | | 0-4-0 | Scrap—B&M 1909 | |
| 720 | | Manchester | — | 1910 | 0-6-0 | 19x24" Re 305 | |
| 21 | Liberty | Concord R. R. | | 1863 | 0-4-0 | ? Scrap C&M | |
| 21 | | Manchester | #1618 | 1894 | 4-4-0 | 18x24" | |
| 721 | | | | | 4-4-0 | Renumbered 938 | |

| | | | | | | |
|-----|------------------|---------------|--------|---------|--------|--------------------------------|
| 22 | Monitor | Concord R. R. | | 1863 | 0-4-0 | ? Scrap C&M |
| 22 | | Manchester | #1591 | 1894 | 0-4-0 | 16x24" |
| 722 | | | | | 0-4-0 | Renumbered 66 |
| 23 | Portsmouth | Taunton | # 119 | 11- | 4-52 | 4-4-0 14x20" Rebuilt & renamed |
| 23 | Gov. Gilmore | Concord R. R. | | 1863 | 4-4-0 | |
| 23 | Gov. Gilmore | Concord R. R. | | 1879 | 4-4-0 | ? |
| 723 | | | | | 4-4-0 | Scrap—B&M 1903 |
| 723 | | Manchester | — | 1905 | 0-6-0 | 19x24" Re 228 |
| 24 | John Kimball | Amoskeag | — | 1856 | 4-4-0 | Destroyed in a wreck in 1865 |
| 24 | B. A. Kimball | Concord R. R. | | 1865 | 4-4-0 | 16x24" Renamed |
| 724 | Rumford | | | | 4-4-0 | Scrap—B&M 1898 |
| 724 | | Schenectady | #4713 | 1898 | 4-6-0 | 21 & 32x26" Re 2034 |
| 25 | Gen. Grant | Manchester | # 67 | 8- | 3-65 | 4-4-0 16x24"—Scrap C&M |
| 25 | | Baldwin | #13186 | 1893 | Forney | Rebuilt |
| 725 | | B & M R. R. | | | 0-4-0 | Renumbered 57 |
| 26 | Gen. Peaslee | Concord R. R. | | 1865 | 4-4-0 | ? |
| 726 | | Schenectady | #4714 | 1898 | 4-6-0 | 21 & 32x26" Re 2035 |
| 27 | Gov. Stearns | McKay & Aldus | — | 1866 | 4-4-0 | ? Scrap C&M |
| 27 | | Manchester | #1569 | 1893 | 0-4-0 | 16x24" |
| 727 | | | | | 0-4-0 | Renumbered 67 |
| 28 | George Minot | Concord R. R. | | 1867 | 4-4-0 | ? |
| 728 | | | | | 4-4-0 | Scrap—B&M 1896 |
| 728 | | Manchester | | 1899 | 4-6-0 | 19x26" Re 2015 |
| 29 | Pembroke | Concord R. R. | | 1868 | 4-4-0 | ? |
| 729 | | | | | 4-4-0 | Scrap—B&M 1898 |
| 30 | Pennacook | Schenectady | #4715 | 1898 | 4-6-0 | 21 & 32x26" Re 2036 |
| 730 | | Concord R. R. | | 1869 | 4-4-0 | 16x24" |
| 730 | | | | | 4-4-0 | Scrap—B&M 1903 |
| 31 | Amoskeag | Manchester | — | 1904 | 4-4-0 | 18x24" Re 977 |
| 731 | | Concord R. R. | | 1870 | 4-4-0 | ? |
| 731 | | | | | 4-4-0 | Sold—B&M 1897 |
| 32 | J. W. Johnson | Schenectady | #4716 | 1898 | 4-6-0 | 21 & 32x26" Re 2037 |
| 32 | J. W. Johnson | Concord R. R. | | 1871 | 4-4-0 | Sold—C&M |
| 732 | | Rhode Island | — | 1891 | Forney | 17x24" |
| 33 | Gov. Smythe | | | | Forney | Renumbered 46 |
| 733 | Winnisquam | Baldwin | #2366 | 2-20-71 | 4-4-0 | 16x24" Renamed |
| 33 | | | | | 4-4-0 | 16½x24" Scrap—C&M |
| 733 | | Baldwin | #14287 | 1895 | 4-4-2 | 19x24" |
| 34 | Victor | | | | 4-4-2 | Renumbered 3200 |
| 734 | | Baldwin | #2409 | 4-8- | 71 | 0-4-0 15x22" |
| 734 | | | | | 0-4-0 | Scrap—B&M 1905 |
| 35 | W. A. Tower | Manchester | — | 1906 | 2-6-0 | Renumbered 1427 |
| 735 | | Concord R. R. | | 1872 | 4-4-0 | 16x24" |
| 735 | | | | | 4-4-0 | Scrap—B&M 1909 |
| 36 | Turtle | Manchester | — | 1910 | 0-6-0 | 19x24" Re 306 |
| 736 | Hercules | Concord R. R. | | 1873 | 0-4-0 | ? Renamed |
| 36 | Hercules | | | | 0-4-0 | Scrap—C&M |
| 736 | | Manchester | #1488 | 1890 | 0-6-0 | 17x24" |
| 37 | Atalanta | | | | 0-6-0 | Renumbered 113 |
| 737 | | Concord R. R. | | 1871 | 4-4-0 | ? |
| 737 | | | | | 4-4-0 | Scrap—B&M 1898 |
| 38 | Peter B. Brigham | Manchester | — | 1899 | 4-6-0 | 19x26" Re 2016 |
| 738 | | Mason | # 497 | 5-24-73 | 4-4-0 | 15x22" See Note |
| 38 | | Schenectady | #4295 | 1895 | 4-4-0 | 19x24" |
| 738 | | | | | 4-4-0 | Renumbered 1160 |
| 39 | Gladiator | Concord R. R. | | 1880 | 4-4-0 | ? Scrap—CRR 1881 |
| 739 | Portsmouth | Manchester | #1130 | 1883 | 0-4-0 | 16x22" |
| 739 | | | | | 0-4-0 | Scrap—B&M 1908 |
| 40 | Vulcan | Manchester | — | 1909 | 4-4-0 | 18x24" Re 1005 |
| 740 | | | #1174 | 1884 | 4-4-0 | 16x22" |
| 740 | | | | | 4-4-0 | Scrap—B&M 1907 |
| 740 | | Manchester | — | 1908 | 0-6-0 | 19x24" Re 268 |

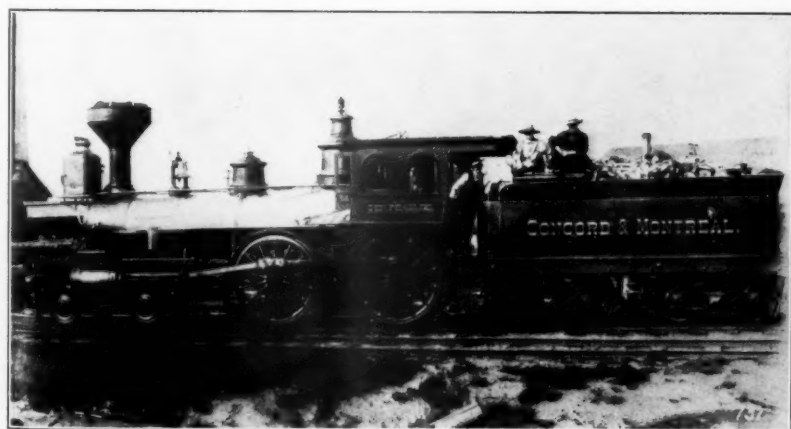
| | | | | | | |
|-----|-----------------|---------------|-------|------|-------|-----------------|
| 41 | Piscataqua | Manchester | #1242 | 1885 | 4-6-0 | 19x24" |
| 741 | | | | | 4-6-0 | Renumbered 1927 |
| 42 | Gov. Currier | Concord R. R. | | 1885 | 4-4-0 | 16x24" |
| 742 | | | | | 4-4-0 | Renumbered 603 |
| 43 | Pawtuckaway | Manchester | #1253 | 1885 | 4-6-0 | 19x24" |
| 743 | | | | | 4-6-0 | Renumbered 1928 |
| 44 | Draco | Manchester | #1299 | 1887 | 0-4-0 | 16x22" |
| 744 | | | | | 0-4-0 | Renumbered 64 |
| 45 | Tahanto | Concord R. R. | | 1887 | 4-4-0 | 17x24" |
| 745 | | | | | 4-4-0 | Renumbered 613 |
| 46 | Conqueror | Manchester | #1300 | 1887 | 4-4-0 | 18x24" |
| 746 | | | | | 4-4-0 | Renumbered 867 |
| 47 | Uncanoonuck | Manchester | #1335 | 1887 | 4-4-0 | 18x24" |
| 747 | | | | | 4-4-0 | Renumbered 868 |
| 48 | Atlas | Manchester | #1422 | 1889 | 4-6-0 | 19x26" |
| 748 | | | | | 4-6-0 | Renumbered 1957 |
| 49 | Madison | Manchester | #1474 | 1890 | 4-6-0 | 19x24" |
| 749 | | | | | 4-6-0 | Renumbered 1944 |
| 50 | Nathan Parker | Manchester | #1431 | 1889 | 4-4-0 | 17x24" |
| 750 | | | | | 4-4-0 | Renumbered 760 |
| 51 | Chas. E. Tilton | Manchester | #1433 | 1889 | 4-4-0 | 17x24" |
| 751 | | | | | 4-4-0 | Renumbered 761 |
| 52 | C. A. Busiel | Manchester | #1432 | 1889 | 4-4-0 | 17x24" |
| 752 | | | | | 4-4-0 | Renumbered 762 |
| 53 | S. N. Bell | Manchester | #1434 | 1889 | 4-4-0 | 17x24" |
| 753 | | | | | 4-4-0 | Renumbered 763 |
| 54 | Montreal | Manchester | #1435 | 1889 | 4-6-0 | 18x24" |
| 754 | | | | | 4-6-0 | Renumbered 1910 |
| 55 | Dragon | Manchester | #1436 | 1889 | 4-6-0 | 18x24" |
| 755 | | | | | 4-6-0 | Renumbered 1911 |
| 56 | Nashua | Manchester | #1437 | 1889 | 4-6-0 | 18x24" |
| 756 | | | | | 4-6-0 | Renumbered 1912 |
| 57 | Candia | Manchester | #1438 | 1889 | 4-6-0 | 18x24" |
| 757 | | | | | 4-6-0 | Renumbered 1913 |
| 58 | Gen. Lafayette | Manchester | #1448 | 1890 | 4-6-0 | 19x24" |
| 758 | | | | | 4-6-0 | Renumbered 1942 |
| 59 | Daniel Webster | Manchester | #1449 | 1890 | 4-6-0 | 19x24" |
| 759 | | | | | 4-6-0 | Renumbered 1943 |

The "Merrimac" #5 was the "F. H. Spaulding" from the Nashua, Acton & Boston R. R. The "Peter B. Brigham" #38, came from the same road but was not renamed. In addition to these two engines, the Nashua, Acton & Boston R. R. had two other locomotives—the "Tudor," purchased from the Fitchburg R. R. and the "Express," renamed "Dunstable" from the Eastern R. R. Both engines were used to build the road and were discarded by the Concord R. R. when they took over the Nashua, Acton & Boston R. R.

The "Gladiator" was an experiment, designed and built by Mr. Frank M. Stevens, Master Mechanic of the Concord R. R. and Mr. John H. Pierson. The boiler had a flat top and the tubes were upright. The engine rode ahead. It started out from Concord with about twenty-six freight cars and arrived in Nashua with only the caboose. The failure was due to the fact that there was no steam space in the boiler and the engine continually working water. This was the only trip the engine ever made. The tender was placed behind the "Gov. Gilmore" and the forward truck, drivers and a portion of the frame went into the "Gov. Currier." The remainder went into the scrap heap. The cost of the engine, as stated, was \$16417.06.



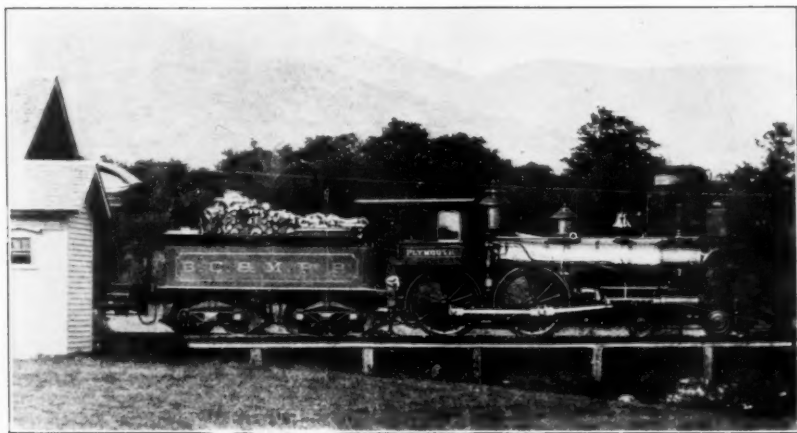
Concord R. R. "Gen. Stark." Amoskeag, 1849.



Concord & Montreal R. R. "Gen. Peaslee." Concord R. R. 1865.



Concord & Montreal R. R. "Gov. Straw." Concord R. R., 1870.



B. C. & M. R. R. "Plymouth." Manchester, 1870.

Courtesy of C. B. Burr

BOSTON, CONCORD & MONTREAL R. R.

The Boston, Concord & Montreal R. R. was chartered Dec. 27, 1844, to build a railroad from Concord to Woodsville, New Hampshire, a distance of 93.6 miles. The road was opened as far as Tilton on May 22, 1848, but Wells River, Vermont, was not reached until May 10, 1853. The engine—"Old Man of the Mountain" drew the first train into Merideth Bridge, now Laconia and the "Josiah Quincy" and "John McDuffie," named after the first President and the first Surveyor of the road, respectively, pulled the first train into Plymouth on January 21, 1850. On June 1, 1884, the road was leased to the Boston & Lowell R. R. but the lease was annulled in 1887. The road was consolidated with the Concord R. R. to form the Concord & Montreal R. R. on Dec. 31, 1889 and the Concord & Montreal R. R. was leased to the Boston & Maine R. R. on June 29, 1895.

Examination of the early reports of the Boston, Concord & Montreal R. R. yields us only a roster of their locomotives dated 1856, which is as follows:

| | | | | |
|-------------------------|------------------|----------|---------|-------|
| Old Man of the Mountain | Hinkley & Drury | 1848 66" | 22 tons | I. C. |
| Lady of the Lake | Hinkley & Drury | 1848 60" | 22 tons | I. C. |
| Granite State | Hinkley & Drury | 1848 54" | 23 tons | O. C. |
| McDuffee | Boston L. W. | 1849 54" | 23 tons | O. C. |
| Old Crawford | Boston L. W. | 1849 66" | 22 tons | I. C. |
| Josiah Quincy | Lyman Souther | 1855 66" | 23 tons | I. C. |
| Peter Clark | Boston L. W. | 1851 66" | 23 tons | O. C. |
| Moosilauk | Boston L. W. | 1853 60" | 24 tons | O. C. |
| J. N. Elkins | Boston L. W. | 1853 66" | 23 tons | I. C. |
| Winnipisaukee | Boston L. W. | 1853 60" | 24 tons | O. C. |
| Pehaugen | Boston L. W. | 1853 60" | 24 tons | O. C. |
| Ahquedauken | Boston L. W. | 1853 66" | 22 tons | I. C. |
| Pony(four wheel) | Boston L. W. | 1852 54" | 14 tons | I. C. |
| Paugus(four wheel) | B. C. & M. R. R. | 1855 54" | 18 tons | I. C. |
| Chocorua | B. C. & M. R. R. | 1856 66" | 23 tons | O. C. |

As the result of the B. C. & M. engines being renumbered in the Boston & Lowell series, there was considerable renumbering and some renaming of locomotives. When the Boston & Maine R. R. took control of the Concord & Montreal R. R., the names were removed from the locomotives, in fact some of the last engines ordered by the Concord & Montreal R. R. never carried any name. In order to present this list with the least confusion, I have thought it best to omit the Boston & Lowell numbers. On the first line will be found the B. C. & M. number, followed by the C & M number and, in event of an omission of a number in its proper place, it will indicate that the engine never carried one or the other. The Boston & Maine number is in such a group as to make it easy to follow and in the event that the engine was renamed by the Concord & Montreal R. R., the new name will be found on the line given to the Boston & Maine number. It does not mean that it carried that name on the Boston & Maine R. R.

| | | | | |
|---|-----------------|------|-----------------|---------------------|
| Old Man of the Mt. Pemigewasset— Burned at Lakeport | Hinkley & Drury | #162 | 4-13-48 1861 | 4-4-015x18" renamed |
| Josiah Quincy Burned at Lakeport | Souther | — | 1855 1861 | 4-4-0 |

So far as can be learned, these engines never carried numbers. There is a possibility that the "Quincy" was rebuilt, but if it ever carried a number, we don't know at this late day where to assign it.

| | | | | |
|-----------------------|------------------|--------|----------|---------------------------------|
| 28-60 Tip Top | Manchester | # 726 | 1875 | 4-4-0 16x24" |
| 760 | | | | 4-4-0 Scrap—B&M |
| 760 | Baldwin | #21730 | 1903 | 4-4-0 18x24" Re 967 |
| 25-61 Fabyans | Manchester | # 649 | 1874 | 4-4-0 16x22"—Rebuilt |
| Fabyans | Manchester | | 1889 | 4-4-0 16x22" |
| 761 | | | | 4-4-0 Renumbered 656 |
| 26 Profile | Manchester | # 650 | 1874 | 4-4-0 16x22"—Scrap C&M or sold. |
| 21-62 Guilford | Manchester | # 465 | 1872 | 4-4-0 16½x24" |
| 762 Rebuilt | B & M R. R. | | 1900 | 4-4-0 Renumbered 686 |
| 27-63 Stranger | Manchester | # 657 | 1875 | 4-4-0 16x24" |
| 763 | | | | 4-4-0 Scrap—B&M 1899 |
| 763 | Rhode Island | — | 1900 | 4-6-0 19x24" Re 2062 |
| 1 Granite State | Hinkley & Drury | # 176 | 6- 2-48 | 4-4-0 15x20"—Scrap BC&M |
| 1-64 Granite State | Manchester | — | 1873 | 4-4-0 16x24" |
| 764 | | | | 4-4-0 Scrap—B&M 1907 |
| 764 | Manchester | — | 1908 | 0-6-0 19x24" Re 272 |
| 3-65 Lady of the Lake | Hinkley & Drury | # 187 | 7-17-48 | 4-4-0 15x18" Renamed |
| Belmont | | | | 4-4-0 Scrap—C&M |
| 65 Belmont | Manchester | #1570 | 1893 | 0-4-0 16x24" |
| 765 | | | | 0-4-0 Renumbered 68 |
| 5- Peter Clark | Hinkley & Drury | # 324 | 8-18-51 | 4-4-0 15x24"—Scrap BC&M |
| 66 Peter Clark | Hinkley | — | 1879 | 4-4-0 16x24" |
| 766 | | | | 4-4-0 Scrap—B&M 1905 |
| 766 | Manchester | — | 1906 | 2-6-0 19x26" Re 1428 |
| 6 Paugus | B. C. & M. R. R. | | 1855 | 0-4-0 Renamed |
| Whitefield | | | | 0-4-0 Scrap—BC&M 1877 |
| 6-67 Whitefield | Manchester | | 1878 | 4-4-0 16x24"—Scrap C&M |
| 67 Whitefield | Manchester | #1619 | 1894 | 4-4-0 18x24" |
| 767 | | | | 4-4-0 Renumbered 939 |
| 7-68 Winnipisaukee | Hinkley & Drury | # 440 | 4-29-53 | 4-4-0 15x24"—Scrap C&M |
| 68 Trojan | Manchester | #1529 | 1891 | 0-6-0 17x24" |
| 768 | | | | 0-6-0 Renumbered 114 |
| 10-69 Ahquedauken | Hinkley & Drury | # 487 | 11-22-53 | 4-4-0 15x20" |
| 769 | | | | 4-4-0 Scrap—B&M 1898 |
| 769 | Schenectady | — | 1898 | 4-6-0 21 & 32x26" Re 2042 |
| 11 Pony | Hinkley & Drury | # 357 | 3- 3-52 | 0-4-0 12x20"—Scrap BC&M |
| 11-70 Littleton | Manchester | # 804 | 1880 | 4-4-0 16x24" |
| 770 | | | | 4-4-0 Scrap—B&M 1899 |
| 770 | Schenectady | — | 1900 | 4-6-0 21 & 32x26" Re 2052 |
| 13-71 Belknap | Manchester | — | 1870 | 4-4-0 15x24" |
| 771 | | | | 4-4-0 Scrap—B&M 1895 |
| 771 | Schenectady | #4717 | 1898 | 4-6-0 21 & 32x26" Re 2038 |
| 14-72 Laconia | Hinkley | — | 1870 | 4-4-0 15x24"—Scrap C&M |
| 72 Teaser | Manchester | #1530 | 1891 | 0-4-0 16x22" |
| 772 | | | | 0-4-0 Renumbered 65 |
| 15 Moosilauk | Hinkley & Drury | # 424 | 2- 3-53 | 4-4-0 15x24"—Scrap BC&M |
| 15-73 Moosilauk | Manchester | # 104 | 1-14-68 | 4-4-0 16x24" |
| 773 Rebuilt | Manchester | | 1887 | 4-4-0 Renumbered 657 |
| 16-74 Franconia | McKay & Aldus | — | 1870 | 4-4-0 16x24" |
| 774 | | | | 4-4-0 Scrap—B&M 1897 |
| 774 | Schenectady | #4718 | 1898 | 4-6-0 21 & 32x26" Re 2039 |

| | | | | | | |
|-------|----------------|---------------|---------|-------|-----------|------------------------------------|
| 17-75 | Lancaster | Manchester | # 229 | 1870 | 4-4-0 | 16x22" |
| 775 | | | | 4-4-0 | Scrap—B&M | 1910 |
| 18-76 | Plymouth | Manchester | — | 1870 | 4-4-0 | 14x22" |
| 776 | | | | 4-4-0 | Scrap—B&M | 1903 |
| 776 | | Manchester | — | 1904 | 4-4-0 | 18x24" Re 978 |
| 19-77 | Ammonoosuc | Manchester | — | 1871 | 4-4-0 | 16½x24" |
| 777 | | | | 4-4-0 | Scrap—B&M | 1898 |
| 777 | | Schenectady | — | 1899 | 4-6-0 | 21 & 32x26" Re 2043 |
| 20-78 | Carroll | Manchester | # 366 | 1871 | 4-4-0 | 15x24" |
| 778 | | | | 4-4-0 | Scrap—B&M | 1906 |
| 778 | | Manchester | — | 1907 | 0-6-0 | 19x24" Re 259 |
| 22-79 | Coos | Manchester | # 463 | 1872 | 4-4-0 | 14x22" |
| 779 | | | | 4-4-0 | Scrap—B&M | 1899 |
| 779 | | Schenectady | — | 1899 | 4-6-0 | 21 & 32x26" Re 2044 |
| 23-80 | Northumberland | Manchester | # 464 | 1872 | 4-4-0 | 14x22" |
| 780 | | | | 4-4-0 | Scrap—B&M | 1899 |
| 780 | | Rhode Island | — | 1900 | 4-6-0 | 19x24" Re 2063 |
| 24 | Tilton | Manchester | # 549 | 1873 | 4-4-0 | 16½x24" Scrapped or sold by C&M |
| 12 | Chocorua | B C & M R. R. | | 1856 | 4-4-0 | 15x22"—Rebuilt |
| 12-81 | Chocorua | Manchester | | 1867 | 4-4-0 | 15x22" |
| 781 | | | | 4-4-0 | Scrap—B&M | 1899 |
| 781 | | Rhode Island | — | 1900 | 4-6-0 | 19x24" Re 2064 |
| 29-82 | Mt. Washington | Manchester | # 731 | 1879 | 2-6-0 | 17x24" |
| 782 | | | | 2-6-0 | Scrap—B&M | 1907 |
| 782 | | Manchester | — | 1908 | 0-6-0 | 19x24" Re 273 |
| 30-83 | Ashland | Manchester | # 750 | 1877 | 4-4-0 | 16x24" |
| 783 | | | | 4-4-0 | Scrap—B&M | 1905 |
| 783 | | Schenectady | — | 1906 | 2-8-0 | 20x30" Re 2375 |
| 31 | Bethlehem | Manchester | — | 1880 | 4-4-0 | 16x24" Renamed |
| 84 | Crawford | | | 4-4-0 | | |
| 784 | | | | 4-4-0 | Scrap—B&M | 1904 |
| 784 | | Manchester | — | 1905 | 0-6-0 | 19x24" Re 229 |
| 32-85 | Lisbon | Manchester | # 844 | 1880 | 4-4-0 | 16½x24" |
| 785 | | | | 4-4-0 | Scrap—B&M | 1902 |
| 785 | | Baldwin | # 21741 | 1903 | 4-4-0 | 18x24" Re 968 |
| 33-86 | Warren | Manchester | — | 1881 | 4-4-0 | 16½x24" |
| 786 | | | | 4-4-0 | Scrap—B&M | 1908 |
| 786 | | Schenectady | — | 1909 | 2-6-0 | 19x26" Re 1474 |
| 34-87 | Haverhill | Manchester | — | 1881 | 4-4-0 | 16x24" |
| 787 | Rebuilt | Manchester | | 1895 | 4-4-0 | Renumbered 604 |
| 35-88 | Campton | Manchester | # 1079 | 1882 | 4-4-0 | 16½x24" |
| 788 | | | | 4-4-0 | Scrap—B&M | 1902 |
| 788 | | Baldwin | # 22745 | 1903 | 4-4-0 | 18x24" Re 969 |
| 36-89 | Thornton | Manchester | # 1080 | 1882 | 4-4-0 | 16½x24" |
| 789 | | | | 4-4-0 | Scrap—B&M | 1905 |
| 789 | | Schenectady | — | 1906 | 2-8-0 | 20x30" Re 2376 |
| 37-90 | Canterbury | Manchester | # 1135 | 1883 | 4-4-0 | 17x24" |
| 790 | | | | 4-4-0 | Scrap—B&M | 1909 |
| 790 | | Schenectady | — | 1909 | 2-6-0 | 19x26" Re 1475 |
| 38-91 | Wentworth | Manchester | # 1136 | 1883 | 4-4-0 | 17x24" |
| 791 | | | | 4-4-0 | Scrap—B&M | 1909 |
| 791 | | Manchester | — | 1909 | 0-6-0 | 19x24" Re 288 |
| 92 | Kilkenny | Baldwin | — | — | ? | |
| 792 | | | | — | ? | Scrap—B&M 1906 |
| 792 | | Manchester | — | 1907 | 2-6-0 | 19x26" Re 1448 |
| 93 | Waumbek | Manchester | — | 1874 | 4-4-0 | 16x24" |
| 793 | | | | 4-4-0 | Scrap—B&M | 1895 |
| 793 | | Schenectady | — | 1900 | 4-6-0 | 21 & 32x26" Re 2053 |
| 94 | Star King | Manchester | — | 1874 | 4-4-0 | |
| 794 | | | | 4-4-0 | Scrap—B&M | 1902 |
| 794 | | Manchester | — | 1903 | 0-6-0 | 19x24" Re 209 |

| | | | | | | |
|-----|--|-----------------|--------|------|-------|---------------------------|
| 95 | Turtle | Manchester | — | 1876 | 0-4-0 | 14x20" Rebuilt & re-named |
| | Pony | C & M R. R. | | | 0-4-0 | |
| 795 | | | | | 0-4-0 | Scrap—B&M 1905 |
| 795 | | Manchester | — | 1906 | 0-6-0 | 19x24" Re 238 |
| 96 | Jefferson | Reb. Portland | — | 1870 | 0-4-0 | 13x22" |
| 796 | | | | | 0-4-0 | Scrap—B&M 1902 |
| 796 | | Manchester | — | 1903 | 2-6-0 | 19x26" Re 1371 |
| 97 | Echo | Hinkley | # 1292 | 1879 | 4-4-0 | Narrow Gauge |
| 797 | Sold—St. Clair | Coal & Iron Co. | | | | |
| 797 | | Schenectady | — | 1900 | 4-6-0 | 21 & 32x26" Re 2054 |
| 98 | Bethlehem | Porter | # 431 | 1881 | 0-6-0 | Narrow Gauge |
| 798 | Sold—St. Clair | Coal & Iron Co. | | | | |
| 798 | | Schenectady | — | 1900 | 4-6-0 | 21 & 32x26" Re 2055 |
| 99 | Profile | Hinkley | — | 1879 | 4-4-0 | Narrow Gauge |
| 799 | Sold—Boston, Revere Beach & Lynn R. R. | | # 1 | | | |
| 799 | | Schenectady | — | 1899 | 4-6-0 | 21 & 32x26" Re 2045 |
| 100 | Veteran | Manchester | # 1475 | 1890 | 4-6-0 | 19x24" |
| 800 | | | | | 4-6-0 | Renumbered 1945 |
| 101 | Union | Manchester | # 1476 | 1890 | 4-6-0 | 19x24" |
| 801 | | | | | 4-6-0 | Renumbered 1946 |
| 102 | Paugus | Manchester | # 1477 | 1890 | 4-6-0 | 19x24" |
| 802 | | | | | 4-6-0 | Renumbered 1947 |
| 103 | Woodsville | Manchester | # 1479 | 1890 | 4-6-0 | 19x24" |
| 803 | | | | | 4-6-0 | Renumbered 1948 |
| 104 | Meredith | Manchester | # 1478 | 1890 | 4-6-0 | 19x24" |
| 804 | | | | | 4-6-0 | Renumbered 1849 |
| 705 | John H. Pierson | Manchester | # 1523 | 1891 | 4-6-0 | 18x24" |
| 805 | | | | | 4-6-0 | Renumbered 1916 |
| 106 | Gov. Smyth | Manchester | # 1524 | 1891 | 4-6-0 | 18x24" |
| 806 | | | | | 4-6-0 | Renumbered 1917 |
| 107 | B. A. Kimball | Manchester | # 1541 | 1892 | 4-4-0 | 17x24" |
| 807 | | | | | 4-4-0 | Renumbered 764 |
| 108 | Nathl. White | Manchester | # 1542 | 1892 | 4-4-0 | 17x24" |
| 808 | | | | | 4-4-0 | Renumbered 765 |
| 109 | Not Named | Manchester | # 1576 | 1893 | 4-6-0 | 18x24" |
| 809 | | | | | 4-6-0 | Renumbered 1918 |
| 110 | Not Named | Manchester | # 1577 | 1893 | 4-6-0 | 18x24" |
| 810 | | | | | 4-6-0 | Renumbered 1919 |

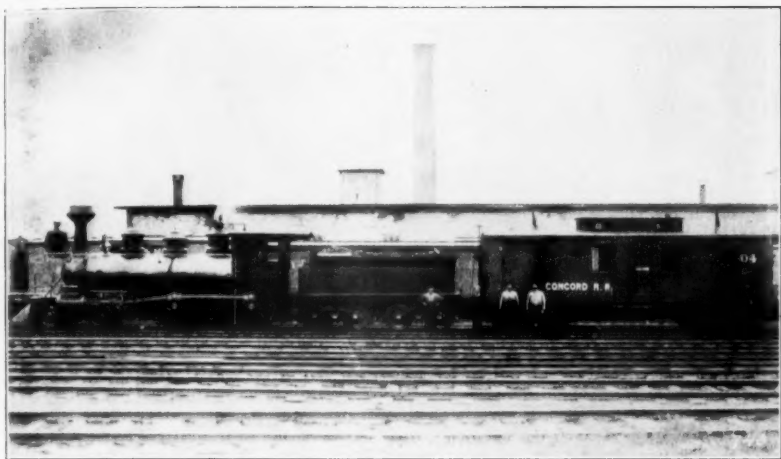
The "Kilkenny" was acquired from the Kilkenny Lumber Co., which was operated by the Concord & Montreal R. R., Lancaster to Kilkenny—14.43 miles.

"The Waumbek," "Star King," "Turtle" and "Jefferson," were acquired from the Whitefield & Jefferson R. R.

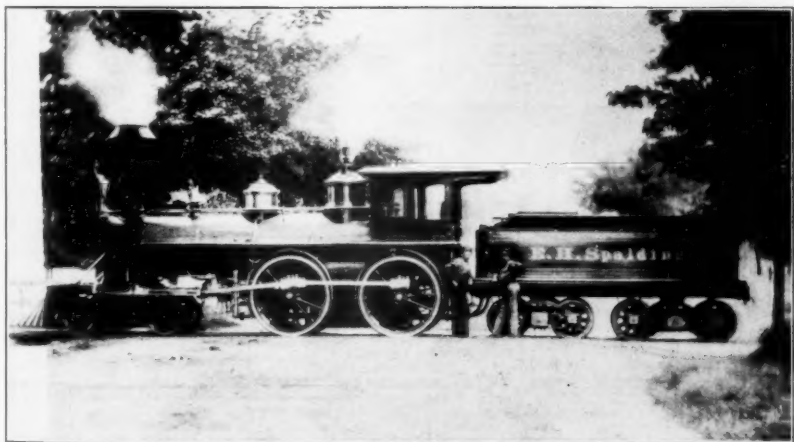
The "Echo," "Bethlehem" and "Profile" were acquired from the Profile & Franconia Notch R. R., narrow gauge. When the road was built to standard gauge in 1896, these engines were sold. The "Profile," after seeing service on the Boston, Revere Beach & Lynn R. R. was sold to the Nantucket Central R. R.

We come now to a group of engines ordered by the Boston & Maine R. R.

| | | | | | | |
|-----|-----------|-------------|------|-------|--------|-----------------|
| 811 | Not Named | Schenectady | 1907 | 2-8-0 | 20x30" | Renumbered 2380 |
| 812 | Not Named | Schenectady | 1907 | 2-8-0 | 20x30" | Renumbered 2381 |
| 813 | Not Named | Schenectady | 1907 | 2-8-0 | 20x30" | Renumbered 2382 |

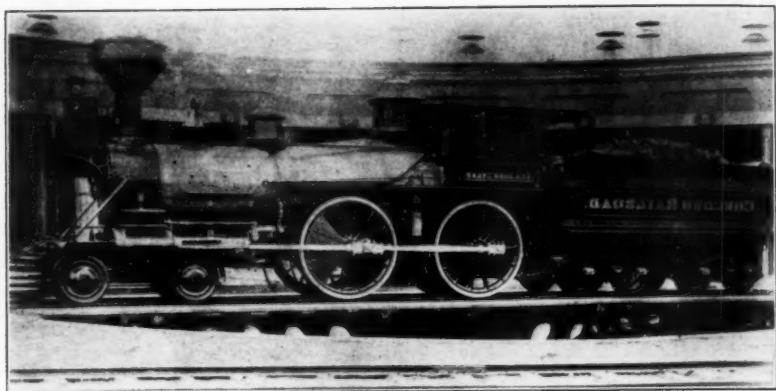


Concord R. R. "Gov. Smythe." Baldwin, 1871.



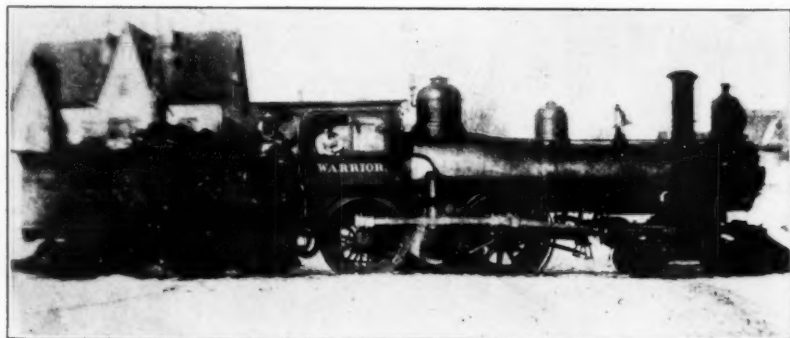
Courtesy of J. Frank Cook

Nashua, Acton & Boston R. R. "E. H. Spaulding." Mason, 1873.



Concord R. R. "Gen. John Stark." Concord R. R., 1878. Courtesy N. W. Fay

The Editor regrets the error made by the engraver in making the above cut causing the locomotive and the lettering to be reversed.



Courtesy N. W. Fay
Boston & Maine R. R. "Warrior" in Service between Concord and Claremont Jct., N. H.

—73—

Before closing, I wish to add a few notes from the sheaf of letters received from Mr. J. Frank Cook. Retired from service by the Boston & Maine R. R. on account of his age, he retains much of his enthusiasm for the engines of the Concord R. R., with which he was so long associated. His letters have been of genuine help in preparing this material and I wish they could be reproduced at length.

"Amoskeag"—the boiler on this engine was the last built by the Amoskeag Co. of Manchester, at the time the plant discontinued locomotive building. For several years it lay unused, was finally purchased by the Concord R. R. and, under Mr. Edward Studley, Master Mechanic, it was used in the construction of this engine.

"Hooksett"—built by Hinkley & Drury and of peculiar construction. Its throttle valve was located in a square box, just abaft the smoke stack, the throttle stem going over the boiler to the cab. The steam pipes were of copper and wound with marline (tarred rope), to protect them from the temperature. Short in length from throttle box to steam chest, the steam was delivered to the cylinders with only a small amount of condensation, showing that in those days the builders were thinking of higher degree temperatures. John Souther built the majority of his engines with the same purpose in view—short dry pipe from throttle to cylinder and a Souther engine was always smart. But, with the steam dome forward, the boiler construction was not strong as it could not be properly stayed.

"Passaconway"—built by the Concord R. R., in their Concord Shops, under the supervision of Mr. C. L. Eastman, Master Mechanic. At the time this engine came from the shop a business agreement had been entered into between the Concord R. R. and the Boston, Lowell & Nashua R. R. This engine was lettered—B L & N R R—the only engine on this road so lettered, and carried it only for a very short time as the Courts of New Hampshire declared the contract illegal and Concord R. R. replaced the other initials.

"Gilmore"—built in the Concord Shops and was dismantled by the Boston & Maine R. R. after they had leased the Concord & Montreal R. R. The boiler was taken out of the frame and sold to some saw mill. A comparatively new engine but its size—15x22" cylinders—barred it from service and there was evidently no sale for it. This engine at one time was the pride of the Concord R. R. Highly colored paints were used, gold and silver leaf for the scroll work and its iron and steel work was highly polished. Attached to the Pay Car "Webster," it brought a smile to many a tired face as it made its monthly rounds. I had the honor to hold its throttle, from the day it came from the shops, for nearly three years.

Relative to the engines on the Nashua, Acton & Boston R. R. they owned four engines:

"Tudor"—a Hinkley & Drury engine purchased from the Fitchburg R. R.

"Express"—A Souther engine purchased from the Eastern R. R. This engine was renamed "Dunstable." At the time the N. A. & B. R. R. was taken over by the Concord R. R., a 13" crack was found in the

crown sheet and this engine along with the "Tudor" was condemned, the combination crank axle of the latter was placed under the "Concord" and used until that engine went out of service. These engines were numbered 1 and 2 respectively and did all the grading on the N. A. & B. R. R.

"E. H. Spaulding," No. 3—a Mason engine. Ran into the open turn table pit at Nashua, N. H., killing its engineer, Samuel Eager. Taken to Concord, N. H., where it was rebuilt by the Concord R. R., renamed "Merrimac," taking the place of the "Uriel Crocker."

"Peter B. Brigham," No. 4—a Mason engine. Retained the same name on the Concord R. R. and was discarded when the new No. 38, a Schenectady engine was received.

"Following the trail of these almost forgotten engines in their wanderings and their final end, is a work of much study and care. Those that held close companionship with them thought only of the engine and the train it could haul. Today they are viewed in a different light. I am glad that my working days were passed in their company. The old engines of the Concord R. R. were a credit to their builders. Of light tonnage compared with those today, nevertheless they did their duty equally well but on a lesser scale. They were the pets of the men that stood on their footboards and each year finds the ranks of these men diminishing. In spite of the unfair competition in the transportation world, the engine of our railways will never become obsolete. Oil for fuel or electricity may change their form, but the engine will continue to turn its wheels, faithful servants to the welfare of our beloved country. This country can never pay the debt it owes to the steam locomotive!"

A short time ago your Editor received the following letter from one of our members—Mr. Nathan W. Fay, which should be of interest to our members:

"Old timers in New Hampshire may recall past days and events with the enclosed picture of the "Warrior". This was a Boston & Maine locomotive in passenger service between Concord and Claremont Jct., N. H., on the Concord and Claremont Branch of the Boston & Maine System. It was among the last of the engines, in that section, to retain a name. It is the writer's opinion that this engine was originally a wood burner and originally used in main line service out of Concord, rebuilt as a coal burner and assigned to lighter work on the branch lines. The engineer in the cab is John Canty of Claremont Jct. and the picture was taken on the Pleasant Street crossing in Claremont, along in the '90's.

"Engineer Canty began his railroad career as a fireman on the Claremont branch, eventually promoted to engineer on the same line where he ever after remained in service. So far as the writer's knowledge goes, Engineer Canty is still running on the Claremont branch, unless the flight of years has placed him on the retired list after his faithful service. He became one of the best known 'eagle-eyes' in that part of the country, in a day when the thrill and romance of railroading had not been usurped by automobiles and flying machines. Not only did John like to roll 'em, but he had a personal touch on the whistle, that let everybody know he was coming into town. Particularly at night when he awoke the echoes with his long, wavering signal for the Broad Street crossing east of the village, people far removed would pause to listen and say—'John Canty is on time tonight.'

"The writer was a boy when John Canty commenced his apprenticeship as a fireman. His engineer, or one of them at least, was the veteran George Wright, long since gone to his reward. The engines of that period were all little eight-wheel wood-burners, shiny with brass and gaily painted. There was the 'Gen. Pierce', No. 14 and the 'C. W. Clarke', No. 27, that for a long time ran the morning and afternoon passenger trains between Claremont Jct. and Concord. The 'Crombie', a smutty eight-wheel 'Jack' was in freight service, and many a Saturday the writer used to chase around the local freight yard, watching the 'Crombie' kicking box cars into one siding or pulling them out of another, the fireboy doing his stuff on the tank brake as there was no air brake on the freight engines at that time. The 'Contoocook' was another that frequently puffed into that part of the country and in her late years, when she was refitted for coal, blossomed forth resplendant with a graceful diamond stack. One of the last freight engines on the Claremont branch with a name, was the 'King Lear', a 4-6-0, long front, straight stack coal-burner. This engine was running up there as late as 1893 as the writer recalls that it was during the World's Fair at Chicago, the 'Lear' ran into an open switch at Claremont and was on the ground with her nose in the sand for several long, sweaty hours. The engineer responsible, so tradition has it, took advantage of the enforced lay-off to visit Chicago and take in the Fair.

"George Wright was one of the engineers in the early days of the Claremont branch. He was a heavy man, heavily bearded and loomed large when in the cab of the 'Pierce' or 'Clarke'. Another large man of the period was Jim Perkins, Road-master, two hundred pounds or more. Perkins used to go out on the morning train quite frequently, riding on the engine with George Wright. The Claremont branch was and is a crooked road and for twenty miles east from Claremont on an ascending grade, it winds along the course of the Sugar river, crossing it about a dozen times in as many miles. The early bridges were of the covered wooden type and some still remain. With the breeze ruffling the beard of Engineer Wright and Road-master Perkins swaying in the gangway as the little engine careened around the sharp curves, it became a saying along the branch that the reason Perkins rode the engine so much was to act as ballast to prevent it from being turned over on some of the particularly militant reverses. The road at that time used iron rails, joined with long wooden fish-plates and lightly ballasted. The schedules were fairly fast for the period but there were no major accidents.

"Col. Charles H. Long was Station Agent at Claremont and at that time his Baggage Master was a cocky little Irishman by the name of Riley. A local wag was responsible for the tradition that the Concord and Claremont branch was like the Mississippi river—"because it was Long and Riley." Gone are the Grey-beards of the throttle of half a century ago and their Hinkley, Rogers and Blood chargers. The writer has no way of knowing where the engines of his boyhood days were built but there is a strong possibility that the majority of them were the output of the locomotive works at Manchester, N. H. Anyway, they were beautiful and smart and had individuality. A whiff of wood smoke that trailed from their stacks in those far-off days, would be perfume without compare.

"New Hampshire and Vermont are rich in railroad history. It would be interesting if some of the fraternity would reminisce about some of the once busy lines—the Peterboro & Hillsboro, the Northern, the Suncook and the Rutland. Some beautiful engines ran in and out of Concord, New Hampshire and there was one—the 'Hampshire', in passenger service between Concord and White River Jct., Vt. Her engineer was Lorin Buntin, who went from the writer's town to enter the railroad game and his departure was noted with envy and his eventual succession to the right side of a locomotive cab hailed with acclaim."

The next group of locomotives that came to the Boston & Maine R. R. were those from the Fitchburg R. R. and these will be listed in our Bulletin No. 37.

The Early History of the "Milwaukee"

By H. E. NICHOLS



ALTHOUGH several charters had been issued by the Territory of Wisconsin for railroad purposes during the period 1838 to 1841, the first to take any definite action, and the pioneer railroad of Wisconsin, was the Milwaukee & Waukesha Railroad Company, chartered and incorporated in 1847, which became the nucleus of the present Chicago, Milwaukee & St. Paul system. The company was organized Nov. 23, 1847, with Dr. L. W. Weeks as its President. Subscriptions were immediately taken, but money was scarce and it was not until April 5, 1849 that the necessary amount was raised. A Board of Directors was elected and Byron Kilbourn chosen President. In 1848 the charter had been amended to authorize the construction of a line to the Mississippi River, and in 1850 the name was changed to the Milwaukee & Mississippi Railroad Company. Construction work was pushed and 1851 saw the line completed to Waukesha, 1853 to Milton, 1854 to Madison and 1856 to the Mississippi at Prairie du Chien, with a total length of 194 miles.

The first locomotive was a 4-4-0 built by Norris, with 14x26 cylinders, 60" drivers and a weight of 46,000 lbs. In 1859 and 1860 the company defaulted in payment of interest on its bonds, a foreclosure was made, and a new company, the Milwaukee & Prairie du Chien Railway Company, took its place. It was operated as such until 1867, when the Milwaukee & St. Paul obtained control.

The Southern Wisconsin Railway Company, chartered in 1852, was authorized to build from Milton to the Mississippi River. When the Milwaukee & Mississippi reached Milton in 1852 it was not authorized to go to Janesville, but under the charter of the Southern Wisconsin, a company was formed that built the 8 miles to Janesville in 1853. Under an amendment to its charter the Milwaukee & Mississippi was authorized to build from Milton to the Mississippi and the Janesville Branch was purchased and extended as far as Monroe, a total distance of 42 miles.

The LaCrosse & Milwaukee Railroad Company, chartered in 1852, was authorized to construct a line between those points. Organized the same year, with Byron Kilbourn as President, no work was done until after its consolidation with the Milwaukee, Fond du Lac & Green Bay Railroad Company in 1854, a company which had been chartered in 1853, and had commenced active operations, but becoming embarrassed in January 1854, consolidated with the LaCrosse company. Work was then progressed and the line completed from Milwaukee to Horicon, 50 miles, in 1855. The Milwaukee & Watertown, chartered in 1851, which built to Watertown, 46 miles, in 1856, consolidated with the LaCrosse company in that year. During 1857 the LaCrosse company completed its line through Portage City to LaCrosse and its Watertown line to Columbus, additions of about 170 miles. The Milwaukee & Horicon Railroad Company, chartered in 1852, built from Horicon to Berlin, 42 miles,

between 1855 and 1857 and subsequently merged with the LaCrosse & Milwaukee.

In 1858 and 1859 the LaCross & Milwaukee and the Milwaukee & Horicon defaulted in payment of interest on bonded indebtedness, and in 1862 and 1863 both roads were sold and reorganized under the name of the Milwaukee & St. Paul Railway Company, as of date May 5, 1863. In the same year control was obtained of the Madison, Fond du Lac & Lake Michigan Railroad Company, who had bought from the LaCrosse company the line from Brookfield to Watertown, styling it the Milwaukee & Western Railroad Company, and constructed branches to Columbus and Sun Prairie, a line in all of 80 miles length. In 1864 the Milwaukee & St. Paul built from Columbus to Portage, from Brookfield to Milwaukee, and from Sun Prairie to Madison. It also purchased the Ripon & Wolf River road, from Ripon to Omro, and extended it to Winneconne, in all 20 miles.

In 1871 the Wisconsin Union Railroad was organized to build from Milwaukee to the Wisconsin-Illinois state line, 85 miles, to connect with a line from Chicago to the state line, organized as the Chicago, Milwaukee & St. Paul of Illinois in 1872. These lines were taken over by the Milwaukee & St. Paul Jan. 1, 1873.

On February 7, 1874 the name of the line was changed to the Chicago, Milwaukee & St. Paul Railway Company, under which name it operated until January 13, 1928, when upon being reorganized after passing into the hands of receivers, it was styled the Chicago, Milwaukee, St. Paul & Pacific Railroad Company.

The majority of the information in the above article is taken from a History of LaCrosse County, Wisconsin, published by the Western Historical Society in 1881.

Yesterdays at the Grand Central

By ARTHUR CURRAN



AT various times there have appeared descriptions of the historic structure that amazed New York in 1871, and was a "show place" for a generation thereafter. These accounts have been more or less accurate according to their authorship, but have been uniform in their lack of "atmosphere" and railroad flavor. The object of the present paper is to supply the many details of interest to railroad men and others that previous writings on the subject have omitted. The task has not been easy as official information on the subject is meagre and difficult to obtain. Moreover, there is a distressing scarcity of suitable photographs wherewith to illustrate even a modest work of this kind. The author has had to rely on his memory for most of the data presented and hopes that the reader will make proper allowance for the difficulties to be met and overcome and that the product of his efforts will be received in the same spirit which prompted them.

The Grand Central Station in New York City was completed in 1871. This statement is eminently correct, inasmuch as the present structure is called a "terminal." The completion of the original Grand Central was the culminating achievement in a series of transactions whereby the Vanderbilt interests came into possession of the New York & Harlem, the Hudson River and the New York Central railroads. At the time, few people believed that the passenger traffic in and out of New York City would ever justify such a building; which, of course, in those days was considered enormous. As a matter of fact, the business handled in the '70's was not startling in amount; but in the '80's it reached a very respectable total and was constantly increasing. During the '90's, the traffic reached a density that no man would have predicted twenty years earlier. Just at the dawn of the twentieth century, the station underwent some alterations, and after that was torn down. This will be referred to later, in connection with the circumstances which rendered the step necessary.

The old Grand Central Station and yards occupied a space bounded on the south by 42nd Street and on the north by 49th Street. The station and its annex extended westward to Vanderbilt Avenue and eastward to a little street then known as Depew Place. North of 45th Street a coach yard extended westward to Madison Avenue and between 47th and 48th Streets the railroad owned property eastward to Lexington Avenue. This latter "parcel" of real estate was used as an engine house by the Harlem road, or "Division," as it became known. There was also a milk depot at this point.

The main train-shed at the Grand Central contained about a dozen tracks and its north end was at 45th Street. At this point there was a foot bridge which crossed all the principal tracks in the yard and com-

manded a splendid view of the activities going on. From this place of vantage, the author saw many of the famous engines and trains of the old days.

Just east of the main train-shed, was the annex. This was a small shed containing four passenger tracks and an express track; the latter slightly depressed and adjacent to an unloading platform where express matter was transferred to the wagons in Depew Place. This annex was used for inbound trains only. Between it and the main train-shed were a couple of tracks, the one nearest the annex being handy as an extra inbound track, and the one nearest the main train-shed being used by local passenger engines just after making a "flying switch" on inbound trips.

This "flying switch" was the subject of much interest and criticism and is worthy of description. It was practiced by all local passenger trains entering the station. As soon as one of these trains emerged from the Park Avenue tunnel, a group of passengers would instantly crowd around the front door of the first car to witness this simple operation. The engine would work hard on the up-grade to 49th Street. At this point the engineer would suddenly shut off steam to relieve the tension on the draft gear. A brakeman would then release the coupler and let out a shout, at the same time waving his right hand. The engineer would then put on as much steam as he could, the air-brake hose would part with a hissing snap and the engine would scurry ahead to the track already mentioned. The towerman, whose business it was to watch these operations, would then throw a switch and the cars would roll, of their own momentum, into the annex.

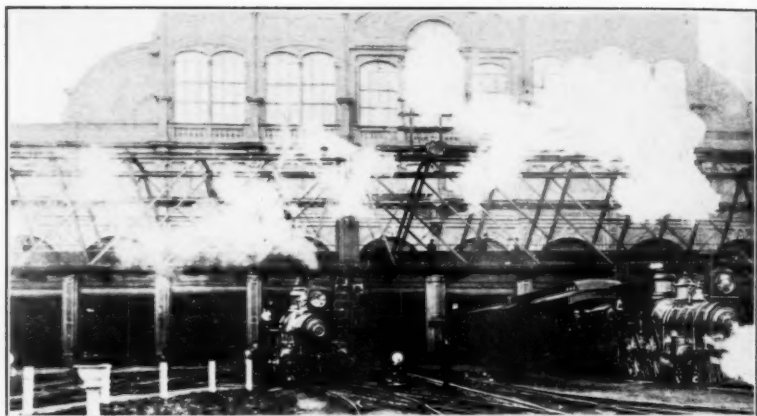
The object of the "flying switch" was, of course, to save time. Local passenger engines were worked hard and had to be made ready for the next trip out almost as soon as they got in. By permitting them to get rid of their trains in the manner described, they were almost immediately free to hurry to their engine house for turning, oiling and getting supplies for the next trip. The train was already in place and all the engines had to do was to back down and couple on.

Critics of this plan called it dangerous, but during the many years that it was practiced there were very few mishaps and these were of such a minor nature as to be unworthy of notice. The Harlem locals consisted of but three cars and the New York Central locals of but four or five. The New Haven locals were more elaborate, their "make-up" often including one or more baggage cars. In such cases the baggage cars were run off with the engine, which then had to back down and make another switch with them after the coaches were safely in the annex. Thus it happened that the brakemen had only a few cars to control with the hand brakes and there was no great danger. Toward the close of the career of the old station, the "flying switch" was abandoned, due to the chaotic conditions resulting from the various alterations going on. But it had served its purpose by that time, anyway, and without causing any of the shocking results feared by the timorous.

As already indicated, the coach yard was located on the west side of the tract of land originally constituting the railroad premises. There were several corrugated iron sheds in this yard probably intended for



View of the Yard at the Grand Central Station in 1900.



Two N. Y. N. H. & H. R. R. Engines Ready to Leave the Grand Central Station



N. Y. C. #2014 Passing 50th Street Bridge Near Grand Central Station.

the storage of the finer passenger cars that were wanted near the station. These, however, were allowed to get out of repair, as the majority of the "palace" cars and handsome coaches for through trains were hauled to Mott Haven after each trip, where there was a more suitable yard for their care. Most of the cars in the coach yard at the Grand Central were used on local or local-express runs.

The engine houses were all on the east side of the yard. The New York Central house was a brick building extending from 45th to 46th Streets. It contained a turn-table and enough stalls to accommodate the engines on local runs. This house was completely roofed over, was rather dark and entered by one door. It was not used by the fast engines as these had a large house of the familiar semi-circular shape at Mott Haven. The New York, New Haven & Hartford house was between 46th and 47th Streets and, in general, resembled the Central's local house. Here the New Haven "made shift" to care for all of its engines in New York, though some had to stand outside wherever they could. It was one of the most crowded places that the author ever visited, but the "boys" were cheerful and made the best of it. That's something, anyhow! The Harlem house was, as before mentioned, between 47th and 48th Streets, the property extending through to Lexington Avenue. Although there was enough room, the house was a "running shed"—that is, it was just a long, straight structure—and the engines were run into it one after another in line on each track. This was not very handy for engines that were actively "on the job," so they stood outside within easy distance of the turn-table, which was in the open air. The Harlem engines which handled the express trains to Chatham were housed at Mott Haven where the Central's "speed merchants" held their "at home" parties. The Harlem "running-shed" at the Grand Central was an old wooden affair of considerable interest, but not much as an engine house.

Between 48th and 49th Streets, the Adams Express Company erected a building which included a shed and platforms for loading cars. This was many years ago, the exact date is not recalled by the author. The American Express Company "held forth" over in the coach yard and had an office on Madison Avenue.

The foregoing gives a fair idea of the Grand Central layout as it existed before the erection of the present Terminal. A minute description of the station itself is not really necessary, though it may be remarked here that the great iron arches that supported the roof of the main train-shed were well worth seeing. The office building, with waiting rooms on the ground floor, was in the shape of an "L," one side along Vanderbilt Avenue and the other on 42nd Street. This building, although a striking and most remarkable structure, was not what might be called palatial at any period of its career. It was the train-shed that was the finest part of the whole "show."

Pictures of the office building, both as built and as altered nearly thirty years later are too common to be worth reproduction here. To be of any value, photographs should show the parts of the station that were adjacent to the yard. So far the author has discovered but one, reproduced in this bulletin, which is a very old view. Both engines in

this picture belonged to the New Haven road, due to the fact that the photographer was interested in that road and not in the owner of the station. Unfortunately no New York Central engines appear in the picture.

No account of the Grand Central district would be complete without some reference to its approaches. The tracks in the station and yard were at street level. From 49th to 59th Streets there was a down grade. As the south portal of the Park Avenue tunnel was at 56th Street, the bottom of the grade was not reached until after north-bound trains had entered the tunnel. The tunnel was two miles long, ending at 96th Street, and had been built when residents had decided that the Harlem tracks on the surface of Park Avenue were too dangerous in a rapidly growing community. At 96th Street the tracks emerged from the side of a hill and had to be carried on a stone viaduct for a mile, more or less, when another hill was reached and they entered a cut. In those days, the 125th Street Station was below street level, as were also the tracks in either direction. This arrangement was all right southbound, from that point, but was often the cause of delay to northbound trains because of the low bridge across the Harlem River, which had to be opened for even very small boats. Conditions were improved when the New York Central elevated the tracks at this point and erected a draw-bridge at a new high level. In making these improvements, the road took advantage of making a four track line instead of a two track affair from Harlem to Mott Haven Jet. The Spuyten Duyvil & Port Morris, which was used by the New York Central trains remained a two-track line up to within recent years. The latter was one of the crookedest pieces of road in the East. It used to run to Kingsbridge, and then made a big loop back to Spuyten Duyvil, as a result of which north bound trains actually ran in a south-westerly direction at this point. The Marble Hill "cut-off" improved the situation to a considerable extent, but not totally.

The Harlem tracks ran then, as now, through a cut between Melrose and Williamsbridge. This had been built at the instance of the local residents who had made representations of the sort which had caused the depression of the road's tracks in Park Avenue. Altogether, the New York & Harlem, or the Harlem Division of the New York Central, was about as costly a piece of road between 42nd Street and Williamsbridge as one could readily desire.

In this connection it is of interest to note that the road's concession to public opinion was the ultimate cause of further expense. Had the tracks been in an open cut, the accident in the Park Avenue tunnel in January, 1902, would probably not have occurred and the terminal district might never have been electrified. Whether the engineer was careless or not, the snow and steam would not have obscured his vision on that dismal winter morning. The author saw this wreck, arriving on the spot only a few moments after the crash. It was nowhere near as bad as the newspapers described it in "padded" accounts. This wreck changed the entire course of events and caused the demolition of the old Grand Central and the obliteration of everything that had given it a character and distinction of its own for a generation.

Some time ago the author was much amused by a newspaper account which referred to the old Grand Central yard as an "inferno." Today Fifth Avenue is filled with the stifling stench from a horde of automobiles, yet this "sensitive" writer makes no mention of it in today's newspaper. If the old Grand Central existed today, the author would gladly go to it for a breath of fresh air in preference to the vile fumes of Fifth Avenue! So much for the difference between the "joy-rider's" pet and the much abused "inferno."

Almost as striking as the disappearance of the old Grand Central was the passing of the "old timers" who made the New York Central famous. These included Messrs. Toucey, the General Manager; Daniels, the General Passenger Agent; Buchanan, the Superintendent of Motive Power; and many others whose unique achievements have never been matched before or since. The present Grand Central Terminal is a beautiful structure, from an architectural point of view, and a monument to the generosity and public spirit of the men who made it possible. But it can never replace the old train-shed in the affections of those who knew the road in its earlier days and found it infinitely more picturesque and interesting as it was than as it is.

The author cannot conclude this brief monograph without commenting on one of the curious results of naming the New York Central station the "Grand Central." The name proved so popular that unmindful persons got the habit of saying that they were going "by the Grand Central" instead of stating by which of the roads which it served they were going to travel. This confusing and misleading error still persists, though it has become so stale that it is no longer amusing. Like the joke about the "cow-catcher" which was not meant to catch cows, but to hurl them from the track.

Well, the old Grand Central is gone these many years, and with it the "Old Man's" private car with its brass bedstead and brass-bound eight wheeled engine to haul it. Gone are the "old timers," from the "Old Man" himself to the switchman who used to make motions with a rolled-up newspaper near the 49th Street bridge! Gone are the sweet-toned bells, accurately made to produce certain definite notes, and highly polished! Gone are the natty Norfolk jackets worn by the Central's old-time brakemen! Gone are the Wagner "palace" cars, as comfortable and easy riding as anything that ever ran on wheels! Gone are the flat cars, with twin cylindrical gas tanks, brought down from Mott Haven to charge the small tanks under the passenger cars that supplied the Pintsch lights, then the wonder of train illumination! Gone in fact are half a hundred other things that went to make up the sum total of—Yesterdays at the Grand Central!

The restless spirit of change, which has been New York's outstanding characteristic for years, is in no place more vividly exemplified than in the district herein described. Certain it is however, that the old Grand Central will be remembered by many as typical of the most interesting period of railroad history and as serving its purpose well. Perhaps, after all, that is as good a recommendation as any railroad structure need have.

C.F. Fisher
→

Brief Sojourns

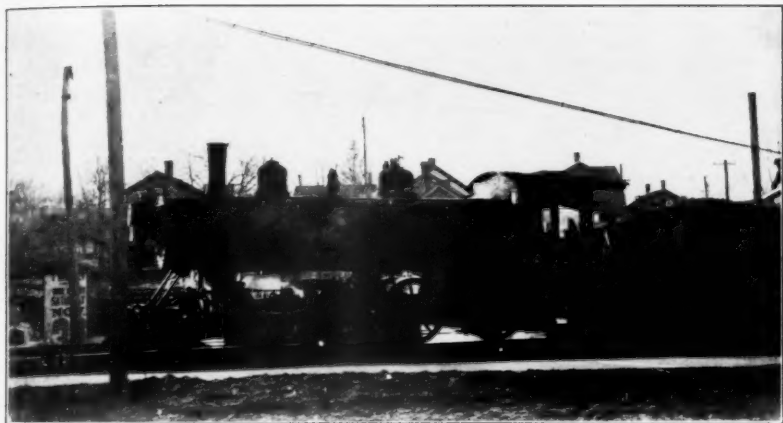
By ANN ARBOR



HE other steam railroad which came within the precincts of Ann Arbor, Michigan, was, at the time I am writing, known as the Ann Arbor Railroad. The road was on the western side of the city and crossed the tracks of the Michigan Central R. R. and the Huron River on a high curved bridge, the original structure being one of the first bridges constructed with a curve. The road ran in back of Ferry Field and, after a football victory, the engines attached to the special trains helped in the celebration with their whistles.

The road was originally projected and owned by the Ashley family of Toledo. It was originally intended to tap the rich lumber district in the State of Michigan, bring it south for the roads, diverging from Toledo. If any railroad had its share of hard luck, certainly this one had more than the usual run. It struggled along under several names—Toledo, Ann Arbor & Grand Trunk R. R., Toledo, Ann Arbor & Northern Michigan and finally, early in this century it was simply the Ann Arbor Railroad. As the road progressed northward, the corporate name often changed. Finally Frankfort, Michigan, 298 miles from Toledo was reached and in later days, car ferries were run from this point to Manistique, Menominee, Kewaunee and Manitowoc. The road ran in a north-westerly direction from Toledo, intersected with every road running east and west in the State of Michigan and was well located to exchange traffic. With the disappearance of the lumber, the consolidation of many of the feeding lines into larger systems in the State of Michigan, the Ann Arbor R. R. had to worry along as best it could.

Up to around 1912, the service consisted of a through train each way daily between Toledo and Frankfort. These trains carried observation parlor cafe cars, the coaches were comparatively new and vestibuled and the train lighted by electricity. It took all day to make the trip to either end of the road, even when the schedule was adhered to and more often it was not. Northbound the train left Toledo around 7:30 A. M., passed through Ann Arbor about 8:50 A. M. and was due at Frankfort in the vicinity of 6:00 P. M. Southbound the train left Frankfort in the morning, came through Ann Arbor around 7:30 P. M. and was due in Toledo around 9:00 P. M. An early morning train left Cadillac, southbound, due at Ann Arbor around 11:30 A. M. and due in Toledo around 1:00 P. M. It returned northward about 4:00 P. M. and arrived at Cadillac late at night. The equipment was the same as the two through trains, without the observation feature. An early morning train left Ann Arbor for Toledo a little after 7:00 A. M. and returned around noon. A ride in this train would carry the passenger back forty years in the old passenger equipment with their oil lamps, narrow windows and head linings. The train was usually pulled by a wheezy ten-wheel Baldwin engine, usually enveloped in steam. The through trains were



Ann Arbor R. R. #111, Baldwin, 1903.



Ann Arbor R. R. #203, Brooks, 1907.



Ann Arbor R. R. #151. Brooks, 1908.



Ann Arbor R. R. Motor Car #5. Leaving Ann Arbor, Mich.

handled by Atlantic type engines from the Brooks plant of the American Locomotive Co. So much for the service prior to 1912, vulgarly known as the "tri-weakly" because there were three trains and each tried to return.

I believe it was about 1912, when the newspapers in Detroit, Ann Arbor and Toledo carried the news that one of the interurban lines intended to extend a line from Ann Arbor to Toledo. Had this been done the local business of the Ann Arbor R. R. would have gone to the interurban. To combat this, the management showed considerable courage in the purchase of five new McKean motor cars. These were built at Omaha, Nebr. The car was directly driven by the gasolene motor, heated by hot water, lighted by acetylene. It was pointed in the front and rounded at the back and was able to make 70 miles an hour. In addition to the compartment for the motor, there was a baggage compartment, then the smoking compartment, next came the side entrances and the last and larger compartment was for the passengers. The cars seated about 80 passengers. These cars were distributed throughout the entire system. They would stop at any important road crossing for passengers and these stopping places were marked. In the fifty miles between Ann Arbor and Toledo these cars were subject to something like fifty stops, hence the running time was little better than two hours. One car replaced the early morning train southbound from Ann Arbor and on the northward trip run to Owosso, returning to Ann Arbor in the evening. A northbound car left around 7:00 A. M. for Owosso, returning to Ann Arbor around 2:30 P. M. and continuing to Toledo, leaving the latter place around 5:00 P. M., due in Ann Arbor around 7:30 P. M., ready to go north the next day. Never before or since has the Ann Arbor R. R. given such local service for the other three cars were used in the same fashion on the northern end of the road. Prior to the introduction of these cars, the Ann Arbor trains used the Union Station in Toledo, leaving their tracks at Alexis. Although they had their own station on Cherry St., only the early morning local used that station. It was around 1912 that all trains of the Ann Arbor R. R., used the Cherry Street Station, to the discomfort of those passengers who had a close connection to make with some train out of the Union Station. These McKean cars did the local work thus relieving the two through trains of many stops.

As for the motive power of the Ann Arbor R. R., perhaps the less said the better. The engines always looked as tho' they needed a thorough cleaning and the intervals between their shopping must have been long. The road had four Atlantic type locomotives from the Brooks plant of the American Locomotive Co. and they were received around 1908. They also had about fifteen consolidation type engines from the same place, received about the same time. Prior to these two classes of engines were a group of ten wheel Baldwin engines, some of them were originally Vaucelain compounds, that were used as spare passenger engines for either the main line trains or a McKean motor car failure or for light freight trains. There were also two Pittsburgh 4-6-0 engines on the road. One solitary switcher at Toledo, was I'm told,

the only switcher on the road at that time. Anyone standing alongside the Michigan Central tracks, in the vicinity of their station, would sometimes see an Ann Arbor train, slowly and carefully cross the long bridge, or sometimes one would catch a glimpse of one of the "consols" delivering some freight cars at the interchange with the Michigan Central R. R. Compared with the frequency on the latter road, they were a rarity. Not being of a photographic turn of mind, your Editor has again helped me out in the matter of illustrations.

In closing however, let me state that despite all of its handicaps, the management of the Ann Arbor R. R. deserves no little credit for the way in which they attempted to hold the local passenger business by means of the motor cars. With four trains in each direction between Ann Arbor and Toledo and the same service northward it was possible to make connections at either Toledo or some of the many junction points. The use of the car ferries out of Frankfort brought them much freight which would have gone to other roads. Unfortunately the road had no large feeder on either end and could originate but little business on its own road. Now it is a part of the Wabash System and possibly the outlook may be a bit brighter in this respect. But the charm of riding in one of those "buckboard" coaches, with the oil lamps, narrow windows and the swinging bell-cord has long since disappeared.

Canadian Material

Word comes from Mr. Robert R. Brown, our Eastern Canadian Representative, that the Canadian Railroad Historical Association is compiling a list of Canadian subjects. The file is intended to cover Canadian railroad locomotives as well as those of the Central Vermont, Delaware & Hudson and Rutland Railroads. The information desired is the name of the road, name and number of the locomotive, builder and date, size of print and price or terms of exchange and what your interest is in either American or Canadian subjects. The purpose of this file is twofold—it serves as a file as to where material may be obtained and under what conditions and it will serve to act as a clearing house for the benefit of those which are interested. It is the intention of the Canadian Society to have a complete record of the renaming or renumbering of all of these locomotives and the dates on which they were scrapped. It will also serve to indicate the extent to which Canadian material has been preserved. The response from the Canadian members has been quite general and any of the members of this Society are invited to send in their lists. This data is being compiled by their Exchange Department, Mr. R. V. V. Nicholls, Exchange Manager, 2174 Sherbrooke Street, West, Montreal, P. Q., Canada.

Worth Reading

(Compiled by ELIZABETH O. CULLEN, *Reference Librarian*,
Bureau of Railway Economics, Washington, D. C.)

BOOKS AND PAMPHLETS

The American Railroad in Laboratory. Volume II—Saving Life and Limb. 210 p. Washington, D. C., Chicago and New York, The American Railway Association. *Apply.* Introduction and historical chapter by A. E. Heiss.

Encyclopedia of the Social Sciences, Volume XIII. 674 p. New York, The Macmillan Company. Published July 1934. Railroad section includes an historical outline of development by I. L. Sharfman and Shorey Peterson, p. 74-93, a discussion of railroad labor by Jacob Perlman, p. 93-98, and Bibliographical references, p. 98-100.

The Illinois Central and Its Colonization Work, by Paul Wallace Gates. 374 p. Cambridge, Harvard University Press. \$4.00. "Harvard Economic Studies No. 42." A valuable, interesting, and unusual contribution to the social and economic history of the United States as well as to the detailed information available about the railroad.

Man's Mortality—A Story, by Michael Arlen. 307 p. Garden City, N. Y., Doubleday, Doran & Co. \$2.50. The "time" of this novel is a long time hence when the transport people of the world have taken over the administration of the world in general along with the maintenance of adequate transportation in the interest of peace and economic development.

The Railway Passenger Terminal Problem at Chicago, Report, by Edward J. Noonan. 121 p. Maps. Plans. Diags. Chicago, Ill., Committee on Railway Terminals of the City Council of Chicago. Includes a chapter on history of railroad passenger terminals at Chicago. Recommends consolidation of passenger terminals on the Lake front.

Richard Trevithick, the Engineer and the Man, by H. W. Dickinson and Arthur Titley. 290 p. Illustrated. New York, The Macmillan Co. \$5. The "Trevithick Centenary Commemoration Volume," of the man who produced a steam locomotive in 1811 before its possibilities were appreciated and who also patented a gun carriage, boilers, superheaters, dredging machines, a residence-heating system, and found time to "de-water" the Cerro de Pasco mines in Peru and mine for gold in other parts of South America.

Trails To Rails—A Story of Transportation Progress in Illinois, by Carlton J. Corliss. 48 p. Illustrations. Maps. Chicago, Illinois, The Illinois Central System. *Apply.* Another valuable, interesting, and unusual contribution to the history of this country.

Universal Directory of Railway Officials and Railway Year Book 1934-1935, compiled from official sources under the direction of the Editor of *The Railway Gazette*. 577 p. London, England, The Directory Publishing Co. 20 shillings. Besides the lists of officials, and officials of respective governments concerned with railways, this volume

includes, as usual, brief historical accounts of the larger railroads and systems in each country, tables of gauges, state railway ownership by countries, preservation of historic locomotives and rolling stock, longest and fastest scheduled runs, and other data that help answer many questions.

PERIODICAL ARTICLES

The Articles of Progress, by Garet Garrett. An illustrated account of streamlined trains and other developments in railroading during the last year. Saturday Evening Post, July 23, 1934, p. 5-7, 55-57, 59.

Denver To Chicago—Dawn To Dusk. The "Zephyr's" run. Railway Age, June 2, 1934, p. 819-820.

Development of Transportation in Southern New England, by Kent T. Healy. Physical facilities for transportation and freight and passenger traffic involved. Includes maps. Connecticut Society of Civil Engineers, Inc. Annual Report of Proceedings 1934, p. 95-120.

Locomotives—Old and New, by Frederick J. Prior. Outlines changes in design and construction to provide motive-power adequate for changing service demands from the time when the horse-drawn "evening way car for Ellicott's Mills" was the new thing to the possibilities of stream-lined locomotives of our own time. Locomotive Engineers Journal, September 1934, p. 654-657.

"Transportation"—A Pageant in Four Scenes. Written and produced by members of the Connecticut Society of Civil Engineers, Inc., as part of the observance of the 50th anniversary of the Society, on March 7, 1934. Connecticut Society of Civil Engineers, Inc. Annual Report of Proceedings, 1934, p. 195-221.

Traveling Interiors. Modern design and fabrics as adapted to interiors of railroad trains, airplanes, motor cars and ships. Possibly these pictures will be regarded as interesting examples of the quaintness of 1934, some years hence, altho they picture the newest developments at present. Arts & Decoration, July 1934, p. 30-37.

